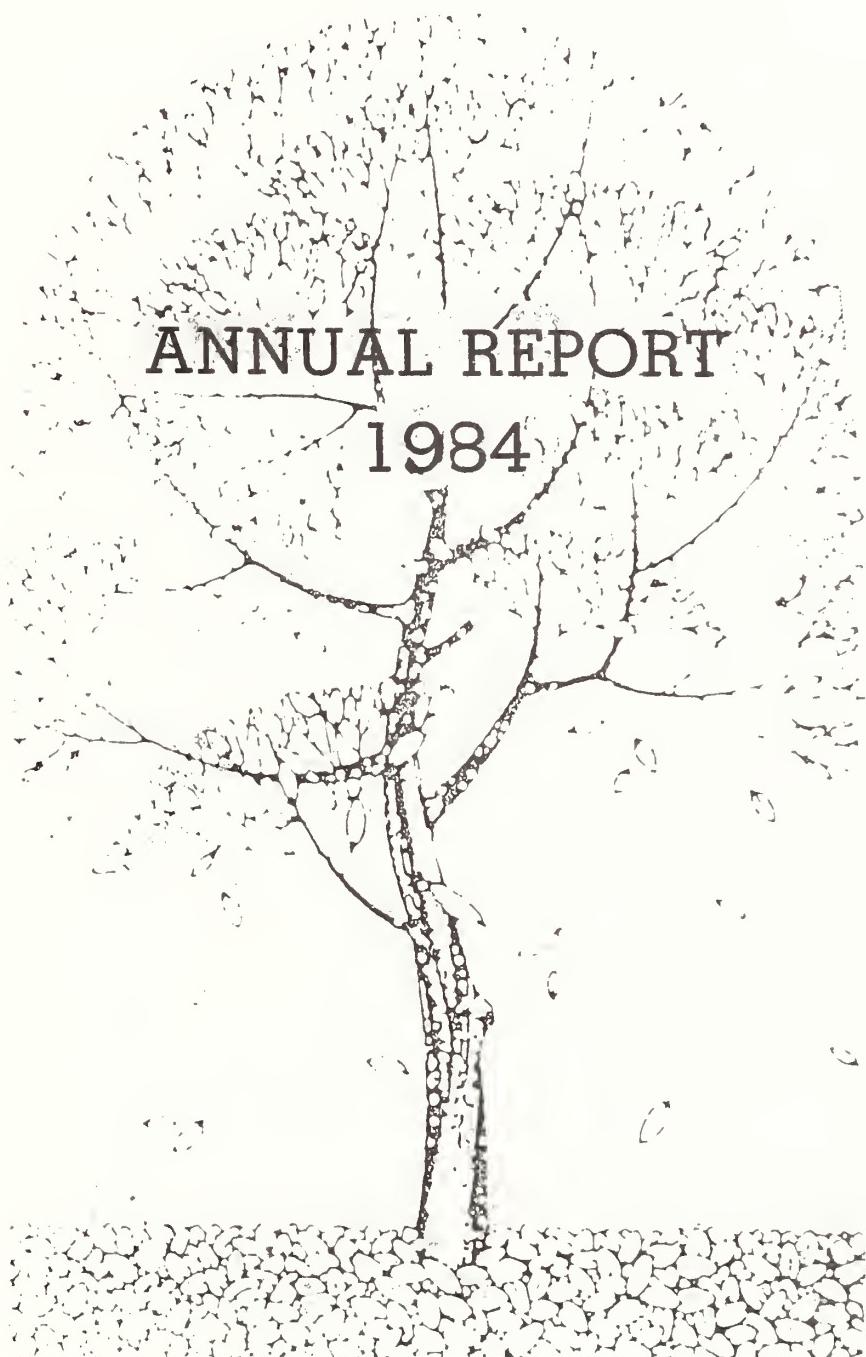


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# U.S. NATIONAL ARBORETUM



ANNUAL REPORT

1984



Agricultural  
Research  
Service

United States  
Department of  
Agriculture



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THEORY OF  
OPTICAL COUPLES

the theory of optical couples. It is the purpose of this paper to present a general theory of optical couples which will include the theory of the optical couple as a special case. The theory will be based upon the assumption that the optical couple is a system consisting of two coupled oscillators, one of which is a source of energy and the other is a sink of energy. The theory will also assume that the energy exchange between the two oscillators is governed by a law of conservation of energy.

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## THE CHARTERING ACT

March 4, 1927

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of Agriculture is authorized and directed to establish and maintain a national arboretum for purposes of research and education concerning tree and plant life. For the purposes of this Act, (1) the President is authorized to transfer to the jurisdiction of the Secretary of Agriculture by Executive order any land which now belongs to the United States within or adjacent to the District of Columbia located along the Anacostia River north of Benning Bridge, and (2) the Secretary of Agriculture is authorized in his discretion to acquire, within the limits of the appropriation authorized by this Act by private purchase, condemnation proceedings, or gift, land so located or other land within or adjacent to the District of Columbia. Provided, That the purchase price of any part of said land shall not exceed the full value assessment of such property last made before purchase thereof plus 25 percentum of such assessed value.

SEC. 2. There is hereby authorized to be appropriated a sum not to exceed \$300,000 to be expended under the direction of the Secretary of Agriculture for the acquisition of land as specified in section 1. No payment shall be made by the United States for any such land until the title thereto is satisfactory to the Attorney General and is vested in the United States.

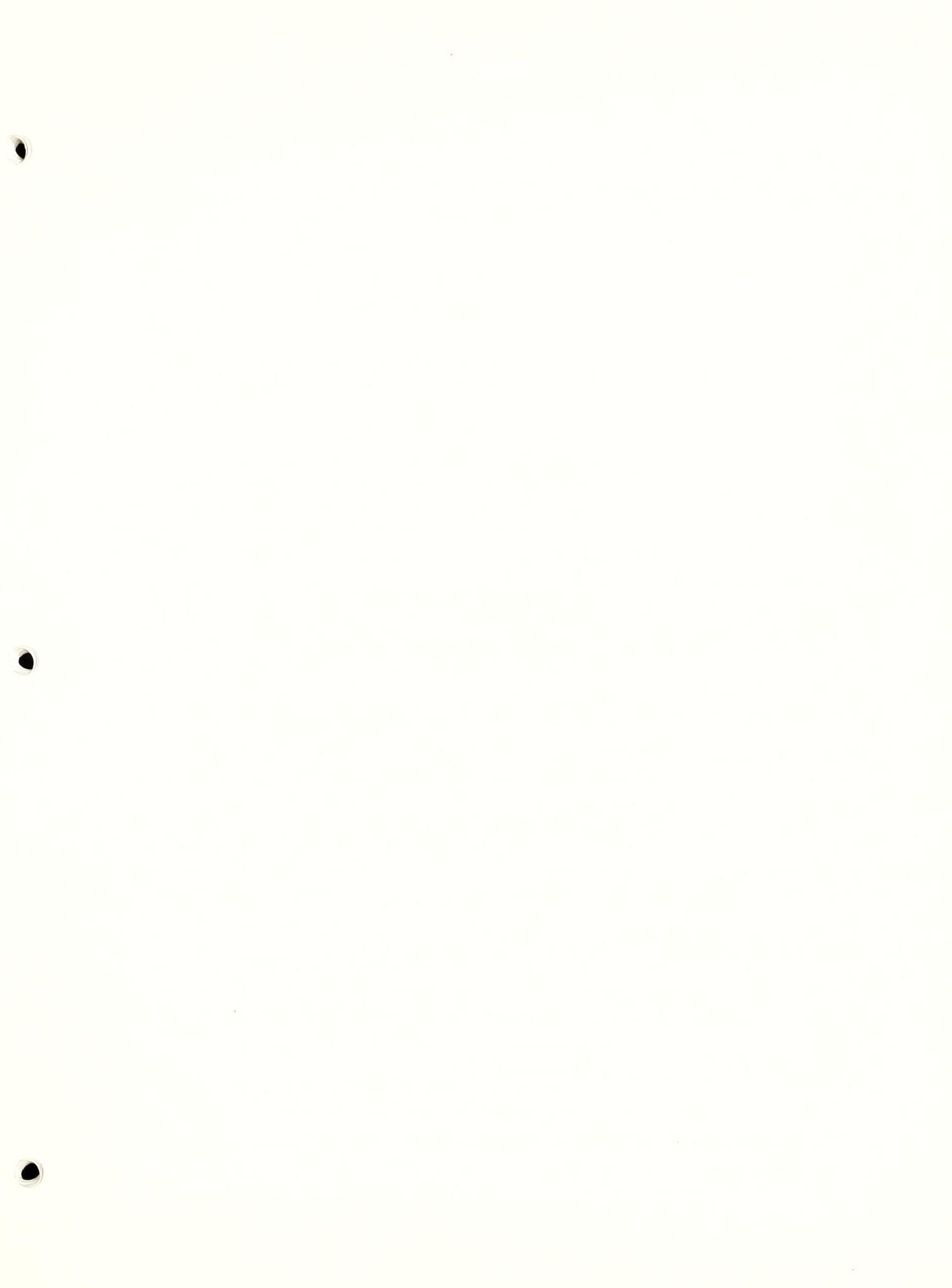
SEC. 3. In order to stimulate research and discovery the national arboretum established by the Secretary of Agriculture in accordance with the provisions of this Act shall be under competent scientific direction. The arboretum shall be administered by the Secretary of Agriculture separately from the agricultural, horticultural, and forestry stations of the Department of Agriculture, but it shall be so correlated with them as to bring about the most effective utilization of its facilities and discoveries.

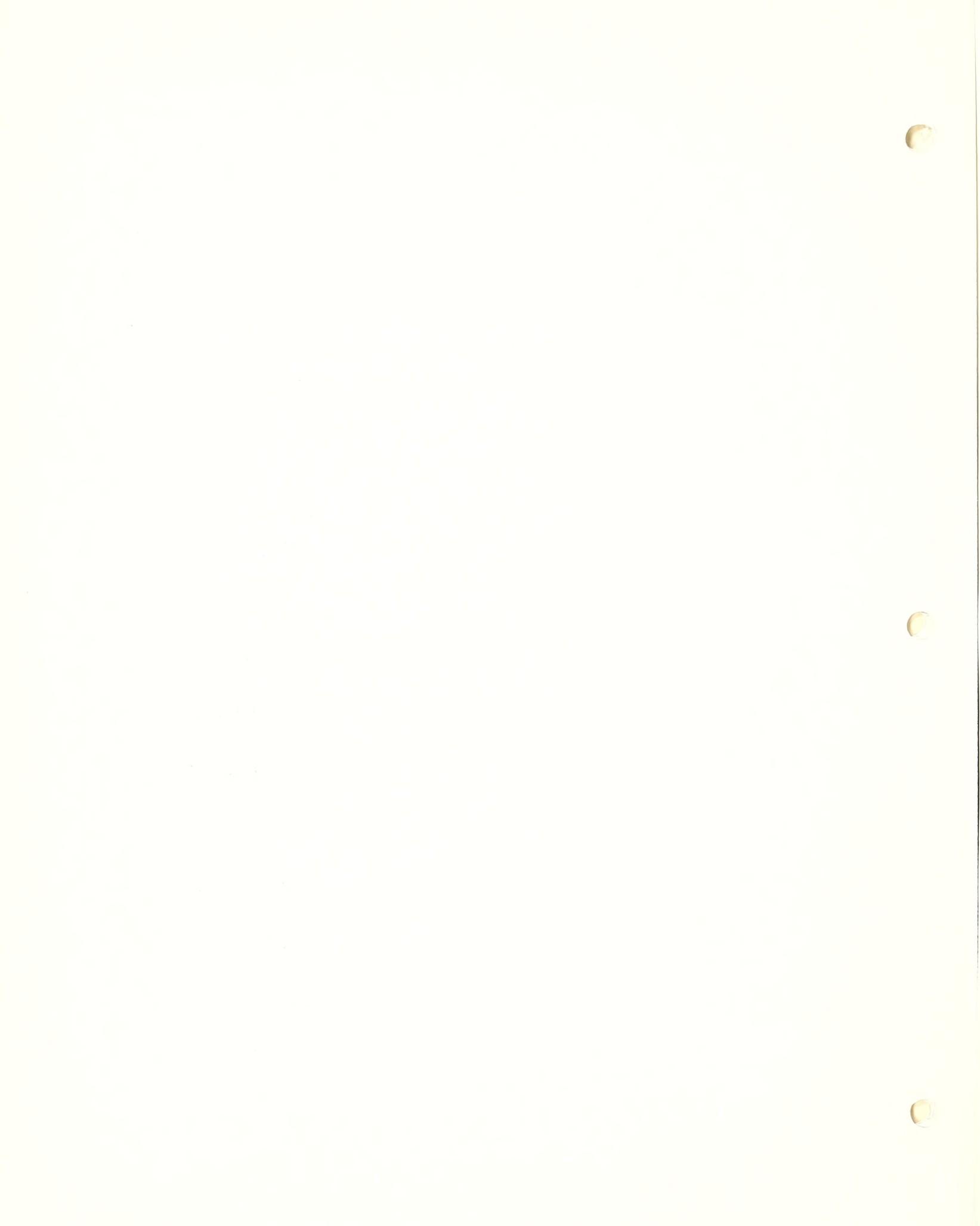
SEC. 4. The Secretary of Agriculture is authorized to create an advisory council in relation to the plan and development of the national arboretum to be established under this Act, to include representatives of national organizations interested in the work of the arboretum.

CHAP. 505—An Act Authorizing the Secretary of Agriculture to establish a national arboretum, and for other purposes.

Approved, March 4, 1927







Annual Research Progress Report 1984  
Cytogenetics, Breeding and Evaluation of Landscape Trees  
01/84 - 01/85

Released the 'Dynasty' cultivar of Chinese elm resistant to Dutch elm disease and elm leaf beetle. Released 2 new hybrid cultivars of Platanus resistant to sycamore anthracnose disease. Also 'Pryored' azalea and 'Spectrum' magnolia. These new cultivars will provide the nursery industry and landscapers with superior low maintenance urban plants. Compiled checklists of cultivars of European ash species and species of Liquidambar and Liriodendron. These lists provide the proper nomenclature to be used for tree cultivars in the nursery trade. Tested more than 6000 Albizia seedlings for resistance to Fusarium wilt and root-knot nematodes. Cultivars resistant to both pests are needed for continued use of this species. Four new selections of Ilex were distributed to stock increase cooperators, and will be named and released when sufficient stock has been propagated. A new selection index theory was developed for use in tree provenance tests. The theory utilized information on individual trees, families, and stands of red maple to derive indices for optimizing breeding progress. This new selection index theory promises to impact the calculation of breeding values of agronomic crop species as well as landscape trees. An indepth study of Dutch Elm disease resistance in elm clones (700 F<sub>2</sub> hybrids) showed several are highly resistant and suitable for release.

Publications

McArdle, A.J. and F.S. Santamour, Jr. 1984. Checklists of Cultivars of European Ash (Fraxinus) Species. *J. Arboric.* 10:21-32.

Eisenbeiss, G.K. and T.R. Dudley. 1984. "Ilex Cultivar Registration List, 1958-1983". *Holly Soc. Amer. Bull.* No. 15 pp.

Eisenbeiss, G.K. and T.R. Dudley. 1984. "International Holly Checklist". *Jour. Holly Soc. Amer.* 2(1):12.

Eisenbeiss, G.K. 1984. "Bibliography of Introduced Ilex Species and Infraspecific Ranks". *Jour. Holly Soc. Amer.* 2(2):1-7.

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Eisenbeiss, G.K. and T.R. Dudley. 1984. "International Holly Registrations". *Jour. Holly Soc. Amer.* 2(3):11-12.

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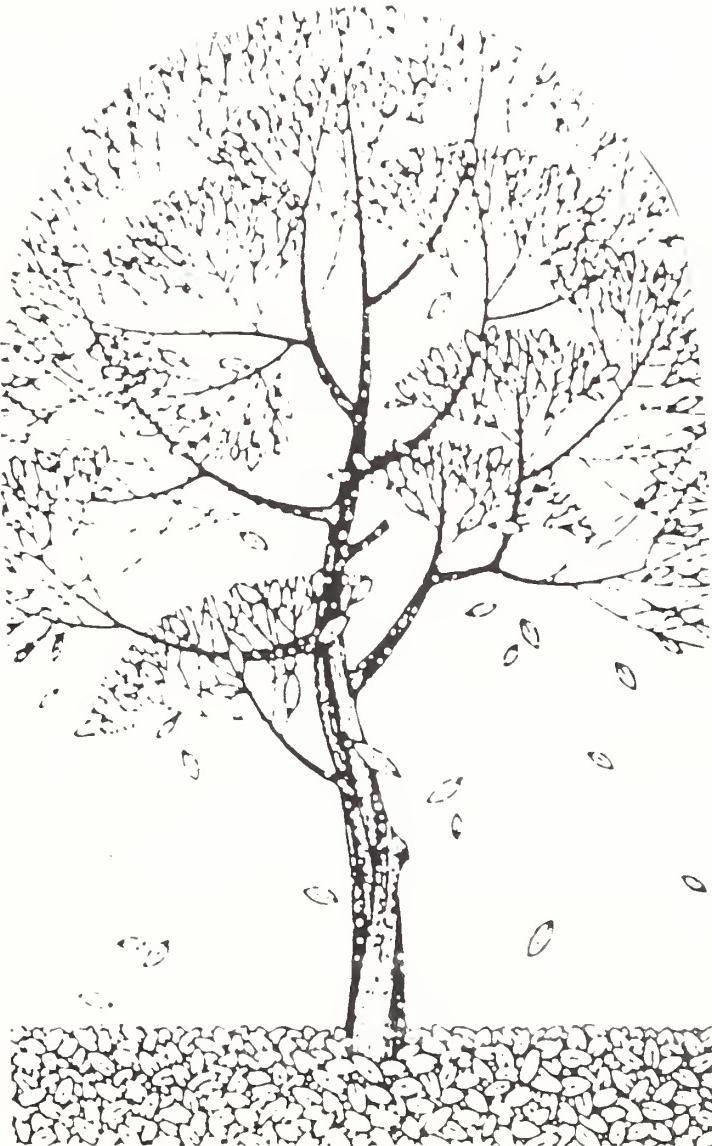
Santamour, F.S., Jr. 1984. Wound Compartmentalization in Cultivars of Acer, Gleditsia, and Other Genera. *J. Environ. Hort.* 2:123-125.

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- Townsend, A.M. 1984. Effect of Sodium Chloride on Tree Seedlings in Two Potting Media. Environ. Pollution 34:333-344.
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Annual Research Progress Report 1984  
Cytogenetics, Breeding, and Evaluation of Ornamental Shrubs  
01/84 - 01/85

Final selections were made and plants propagated for cooperator evaluation and stock increase: Hibiscus syriacus (2 selections from 1,118 progeny), Pyracantha (2 from 1,100), Viburnum (4 from 2,527), Malus (9 from 4,343), and Lagerstroemia (45 from 36,142). In addition, initial seedling selections were made from hybrid seedling populations: 45 Syringa, 58 Prunus, 600 Malus, and 30 Lagerstroemia. This program has been revived after a 2 year lapse due to illness of the principal investigator.



Annual Research Progress Report 1984  
Breeding and Genetics of Woody and Herbaceous Ornamentals  
01/84 - 01/85

Winter hardiness evaluations were made on 1,011 Camellia oleifera hybrids field tested at 14 locations in 4 States (PA, MD, VA, NC) and Washington, D.C. Minimum winter temperatures at these locations ranged from +3° to -15°F. Ratings of 10% or less injury were recorded for 179 clones (including 54 with no visible injury). Two new hybrid Camellia selections were named and released: A high light and heat tolerant selection field tested in Southern FL, TX and CA, 'Sun Worshiper' (PI 483433, NA 39930), and a highly fragrant rose form double, 'Fragrant Joy' (PI 487600). Five new Japanese Iris cultivar releases were distributed to cooperative nurseries for stock increase. Tetraploid forms, produced through colchicine treatment, of Iris kaempferi and I. pseudocorus were hybridized and resulted in development of 50 presumed hybrids. If valid, these hybrids present the potential of introducing yellow flower color into Japanese Iris. Methods for propagating Yucca glauca selections through tissue culture were developed. Selections are presently being increased for distribution to cooperating nurseries.

Ackerman, W.L. 1984. Winter Protection - Plant and Flower Bud Survival. Amer. Camellia Jour. 39(4):29-31.

Ackerman, W.L. 1984. Update on Cold-Hardiness Studies with Camellias in the Northeast. 1984 Amer. Camellia Yrbk. 60-69.

Annual Research Progress Report 1984  
Nomenclature and Taxonomy of Cultivated Plants  
01/84 - 01/85

Identified 863 new collections of cultivated trees, shrubs, woody vines, and ground covers collected in Delaware, Maryland, DC, South Carolina, Georgia, and Alabama for the southeastern U.S. cultivated woody flora project. Preparation of in-depth study of cultivated species and cultivars of Tilia. Added 10,166 research herbarium specimens to permanent collection. Described and published taxonomic, nomenclatural and phytogeographic accounts of 66 species and infraspecific taxa of Ilex from the People's Republic of China. Published the first karyotypic analysis of a new amaryllid: Hippeastrum iguazuianum (Ravenna) T.R. Dudley; comb. nov. Only definitive botanical/horticultural book on Hemlocks (Tsuga) published containing extensive details and descriptions of 22 world-wide species and 289 cultivar names of which 203 were validated and were described and documented for the first time by the Technical Editor. Published documentation of more than 300 internationally registered cultivars of Ilex in a compendium; published and described 12 new (1984) internationally registered cultivars of Ilex. Completed for publication taxonomic, phytochemical and phytogeographical papers on 3 new species of Alyssum from Spain, Portugal and Greece. Completed for publication documentation and description of 60 new cultivars of woody landscape plants that were internationally registered by the International Registrar of Nomenclaturally Cultivated Plants.

#### Publications

Dudley, T.R. 1984. New Taxa of Ilex from the People's Republic of China. *Acta Botanica Yunnanica* 6(1):43-54.

Dudley, T.R. 1984. New Contributions to Ilex of the People's Republic of China. *Journal HSA*, Special Issue: 34 p.

Dudley, T.R. 1984. The Curse of the Confused Identity of Two Chinese Species of Ilex in Cultivation: I. ciliostiposa Loesener and I. centrochinensis S.-y. Hu (The C,C,C, Caper and Consequences). *Journal HSA* 2(2):11-18.

Dudley, T.R. 1984. Technical Editor. The Cultivated Hemlocks (by John C. Swartley), Timber Press, Portland, Oregon. 186 p.

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Dudley, T.R. 1984. Botanical Impressions. *People's Republic of China. Bull. GCA* 72(8):6-10.

Dudley, T.R. 1985. International Registration of Cultivar Names for Unassigned Woody Genera, 1981-1983. *Bull. Amer. Assoc. Bot. Gd. & Arb.* 18(4): in press.

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- Dudley, T.R. 1985. A Nickel Hyperaccumulating Species of Alyssum (Cruciferae) from Spain: Alyssum malacitanum (Rivas Goday) T.R. Dudley, comb. & stat. nov. Feddes Repertorium Sp. Nov. 96(1-2): in press.
- Dudley, T.R. 1985. About Casseena (Ilex vomitoria): Black Drink. Journal HSA 3: in press.
- Dudley, T.R. 1985. Additions to the Ilex Flora of the People's Republic of China. Journal HSA 3: accept. for publ.
- Dudley, T.R. & D. Christodoulakis. 1985. A New Endemic from Samos: Alyssum samium T.R. Dudley & D. Christodoulakis, sp. nov. Willdenowia: accept. for publ.
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- Eisenbeiss, G.K. & T.R. Dudley. 1984. International Ilex Cultivar Registrations. Journal HSA 2(3):11-12.
- Eisenbeiss, G.K. & T.R. Dudley. 1984. International Holly Checklist. Journal HSA 2(1):12.
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- Mazzeo, P.M. 1984. Yes, Virginia, There Is a Round-leaf Birch (Abstract). Va. Acad. Sci. (35(2)):95.

## EDUCATION AND INFORMATION REPORT

Response to Public Queries: The Education Department answered 48,000 requests for information including questions about plant problems, events, classes, plant identification and location of plants and collections. Many of the questions are handled by our receptionist, Joyce Jones, and by Mary Beth Donoghue in the Education Office. Questions and scheduling of tours are handled by Mary Ann Jarvis. Questions involving plant problems and landscape recommendations are generally handled by the Curator of Education.

Questions include both telephone, in person and written inquiries.

Volunteer Guide Service: Volunteer guides conducted 200 tours of the National Arboretum during the past year. Volunteer guides and student guides serve under a cooperative agreement between the Arboretum and the National Capital Area Federation of Garden Clubs with Mrs. Audrie Whitney representing the Federation as Volunteer Guide Chairman.

Intensive guide training classes were scheduled through the Arboretum Education Department. These classes and tours of Arboretum collections are conducted by Arboretum staff members and plant society specialists.

Tour scheduling is handled by Mrs. Mary Ann Jarvis of the Arboretum Education Department.

Adult groups and garden clubs accounted for nearly one-half of the above tours with the balance consisting of senior citizens, school groups, junior garden clubs, county extension tours, diplomatic wives, garden editors, college groups, miscellaneous professional groups, and others. This year we celebrated the 25th Anniversary of the founding of the Volunteer Guide Service. Special awards ceremonies and a luncheon were held in the Auditorium of the Administration Building.

In addition to the tours handled by the volunteer guide service, the Curator of Education conducted the following VIP tours:

Board of Director's-National Landscape Association

Mr. Gerardus Van Der Lely, Ministry of Agriculture of the Netherlands and party.

Mrs. Akio Morita, wife of the Chairman and Founder of SONY Corporation, Japan.

By personal request of the Secretary of Commerce

Chinese Library Management Study Team

Mr. H. Husnu Dogan, Turkish Minister of Agriculture and party

Iowa Lakes Community College

Supreme Court Curator's office and Anglo/American Exchange spouses

University of Guelph, Ontario, Canada. Graduate Students in Landscape Architecture

Career Summary Academy, Office of the Superintendent, Division of Career Development Programs, District of Columbia

Director Hebrew University, Israel, Botanical Gardens

Ohio State University, Department of Horticulture group

Virginia Association of Landscape Designers

Hocking Technical College Tree Care Program

Mr. Gibson, Assistant Secretary for Australian Department of Agriculture and Mr. Huston

Rockwood Museum, Wilmington, Delaware  
CSRS

Owner/Manager's group-Florists Transworld Delivery Association  
North Carolina State University, Graduate Students Horticulture and Plant  
Breeding  
Director, Kings Park and Botanic Garden, West Perth, Western Australia Mr.  
Wycherley.

Botanical Art Displays: Art displays in the Administration Building lobby are scheduled on a 6-8 week format. Exhibits of a botanical or horticultural nature representing a variety of media and subject matter were exhibited on the lobby walls and in museum cases. Scheduling of exhibits is done by Mary Ann Jarvis, Program Assistant and Coordinator.

Arboretum Exhibits: The National Arboretum has provided the following special exhibits for display at various shows or functions:

1984 Food and Fitness Fair on the Mall-Herb Garden Display  
National 4-H Center-Arboretum Exhibit  
94th Annual Rock Creek Park Day and International Arts Festival  
American Horticulture Society's Annual Autumn Festival  
GROW Show-Baltimore Civic Center  
Kendall Demonstration School (Gallaudet) Arboretum Exhibit and cut plant material display.  
Takoma Park Flower Show Arboretum Exhibit and display of cut plant material  
Educational Display as part of the Washington Flower Show-National Arboretum display

Exhibits are done by the Curator of the Education and Mr. Louis Williams of the Education Department staff.

Publications: List turned in for earlier report Dr. Porter (Listed under Gardens & Collections)

Popular Publications (USDA)

PA 309 The United States National Arboretum, and PA 879 Fern Valley Trail Guide, have been revised and reprinted. In addition, a special Invitation to Visit the National Arboretum was developed and printed as a handout at flower shows.

Correspondence Aids: 26 correspondence aids on various horticultural topics were prepared or revised for public distribution.

Correspondence aids include lists of recommended species or cultivars, plant sources, and written material on various plants. Mary Ann Jarvis in cooperation with Arboretum staff and Curator's prepares these aids.

Special Project: A key to the major native trees found at the Arboretum was developed. It is hoped that examples of these trees can be located on a map of the Arboretum grounds. This key and map can be used by the general public in locating and identifying the trees on our grounds.

Living Legends: Forty-four Living Legends were prepared by Arboretum Curator's and staff members. These are useful in answering correspondence and providing information to visitors. They are given out at each of the Living Legends programs as a handout. Living Legends are edited by the Curator of Education and printing is handled through Mary Ann Jarvis of the Education Department.

Radio-TV Talks and Interviews: Erik Neumann, Curator of Education participated in the following programs or interviews:

United Press International-National Arboretum - Taped interview on Arboretum News Journal, Wilmington, Delaware - Press interview  
The Writers Center, Bethesda, MD - Press interview  
United Press International-Taped interview on lawns, soils, autumn color for use on radio and in print media.  
Assistance with production of film strip on Bonsai-Photo Com. Productions, Pismo Beach, California  
Assistance with production of slide series "The Living Tree", for Maryland Instructional Television, Maryland State Department of Education  
Appear Periodically through the year Plant Talk with Terry Pogue and Pamela Marshall on WGTS-FM

Talks or workshops were presented for Arboretum audiences as well as special groups including garden clubs, visiting Arboretum groups, high school and college classes, to educational specialists and press groups. Of special note are:

Morrish Gardens of Spain-Walter Reed Officers Club  
Gardens of France-National Arboretum lecture  
Gardens of France-Brookside Gardens, Wheaton, MD  
National Arboretum through the Seasons-Senior Services Center-Arlington, VA  
The U. S. National Arboretum-Widows and Widowers of Northern Virginia. St. Anthony's Church, Seven Corners, VA  
National Arboretum Dogwood Collection-prepared for Arboretum Volunteer Guides  
National Arboretum lecture-Volunteer Guides at National Arboretum  
Arboretum Education Program, Library, Plant Records and Mapping the National Arboretum-Arboretum Volunteer Guides  
Azaleas and Rhododendrons at the National Arboretum-Arboretum Volunteer Guides  
Using Groundcovers for Landscaping-Lincolnia Hills Garden Club, Annandale, VA  
The National Arboretum-FTD Florists-Spring Workshop  
The National Arboretum Congress Heights Elementary School by requests of Partnerships in Education, Office of Private Sector Initiatives, The White House  
Served on the faculty for two Smithsonian Institution workshops:  
Horticulture in a Museum Setting Workshop, Office of Museum Programs  
Gardens By Design Seminar, Smithsonian National Associates Program

USDA Graduate School Committee on Field Studies and Horticulture-Serves on this committee as coordinator of the National Arboretum Horticulture Series. Responsibilities include selection of instructors, course content, and promotion of the program. Regularly attends USDA Graduate School Teacher/Learning Effectiveness Workshops held for Graduate School faculty and staff.

The following classes are now held on a regular basis at the Arboretum in the National Arboretum Horticulture Series and in the Natural History Field Studies Program in cooperation with the Audubon Naturalist Society:

- Basic Methods of Plant Propagation
- Indoor Light Gardening
- Plants in the Home
- Introduction to Bonsai
- Herbs
- Home Vegetable Gardening
- The Home Greenhouse
- Raising and Using Annuals, Perennials, Bulbs, and Roses
- Ornamental Woody Landscape Plants of Winter
- Ornamental Woody Landscape Plants of Spring
- Ornamental Woody Landscape Plants of Summer
- Ornamental Woody Landscape Plants of Fall
- The Care and Maintenance of Outdoor Plants
- Nature Photography
- Woody Plant Identification
- Spring-Flowering Identification
- Nonflowering Plants
- Ferns and Fern Allies
- Introduction to Landscape Architecture
- Landscape Architecture Materials and Techniques of Construction
- Landscape Use of Trees, Shrubs, Vines, and Flowers
- Wildflower Cultivation

The Adult Education Classes are taught in a 3- to 10- session format, making use of classroom and Activity Center facilities at the Arboretum. Instructor's include Arboretum staff members as well as specialists from local plant societies and the Extension Service.

National Arboretum Public Programs: The Curator of Education in Cooperation with the Friends of The National Arboretum offers programs for the public on a regular basis. These are publicized through an Events Newsletter published and distributed ten times each year. From 10 to 12 programs and events and exhibits were offered and publicized monthly in the newsletter written and edited by the Curator of Education.

Meetings and Events: Over 500 functions were held at the Arboretum. Some of the regularly scheduled horticultural and botanical organization meetings held in the Arboretum auditorium are: The Potomac Unit of the Herb Society of America, Herb Study Group, Gloxinia and Gesneriad Society, Begonia Society, Washington Bonsai Club, and Orchid Judging Center meet on a monthly basis; Camellia Society of the Potomac Valley, Potomac Valley Chapter of the American Rhododendron Society, and bimonthly; Washington Daffodil Society, Holly Society, Washington Daylily Club, and Potomac Lily Society meet quarterly; C & P Iris Society and the Potomac Valley Chapter of the American Rock Garden Society and Boxwood Society meets annually. The National Capital Area Federation of Garden Clubs, Inc., holds bimonthly meetings at the Arboretum, as well as various committee meetings throughout the year, including a Horticulture School and Landscape Critics Council, Historic Preservation Seminar, Food Gardening Workshop, Wildflower seminar, Judges School, and George Washington University Plants Class meets weekly.

Horticulture Hiring the Handicapped Workshop  
D.C. Science Educator's Seminar  
Northern VA Nurserymen's Association Meeting  
Reception for presentation of Goshen Bonsai  
FONA Insider's Day  
DC Environmental Services Seminar  
Indiana Society Reception-Congressman John Meyer  
Asian Valley Dedication  
American Plant Physiologists Annual Meeting  
Pittsburg Plate Glass Living Color Show  
DC Schools-Thomas Ayrs Awards Program  
International Neighbor's Tour/Tea  
Congressman Steny Hoyer Reception-Opening of Gladys Noone Spellman Parkway  
Mid-Atlantic Plant Moceular Annual Meeting  
Herb Plant Sale  
Herb Day  
Orchid Day

Flower Shows: The following plant societies held flower shows in the auditorium of the Administration Building: Potomac Valley Camellia Society (spring and fall show), Washington Daffodil Society, Potomac Bonsai Association, National Capital Daylily Club, National Capital Iris Club, and the National Capital Orchid Society, Potomac Valley Rhododendron Society, Potomac Lily Society, and Gloxinia and Gesneriad Society. These flower shows play an important role in the Arboretum's educational program, and their attendance is overwhelming.

Publicity, Press Releases, Mailing List: In order to publicize Arboretum programs and events the Education Department distributes a monthly Events Newsletter which is distributed to over 5,000 persons on a regular basis. The Events Newsletter and Press Releases are written and edited by the Curator of Education, a special press list is maintained by Mary Ann Jarvis, Program Coordinator, and is sent in advance to over 80 members of the print and radio-TV media. The mailing list is maintained and distributed by Mary Beth Donoghue, Clerk-Typist, and mailing assistance is provided by Joyce Jones Receptionist, and Louis Williams, Projectionist and Education Assistant.

In compliance with Federal Regulations, a return postcard was sent to individuals on the Arboretum mailing list which must be returned in order to remain on our list. This should help remove individuals who do not wish to continue receiving announcements of Arboretum events.

Slide Collection: A concentrated effort continues to be made to photograph plant material commonly used in the landscape in order to assemble a comprehensive set of 35mm slides to be copied and made available for teaching purposes to other institutions and individuals. In addition to regular additions of slides to the permanent collection, a slide set of eight (80) slides has been assembled and duplicated for distribution to organizations nationwide who wish to present a program on the U. S. National Arboretum. An accompanying text has been prepared by the Curator of Education and is provided with each slide set. Mr. Louis Williams, Projectionist and Education Assistant is now taking photographs for the permanent collection and for documenting special events. Mary Beth Donoghue, maintains the slide collection and selects photographs for press and magazine use on a regular basis.

Training:

Louis Williams - Introduction to Photography, Basic Spelling and Vocabulary

Mary Beth Donoghue - Landscape Plants of Fall, Landscape Plants of Winter, Landscape Plants of Spring

Mary Ann Jarvis - Landscape Plants of Winter

Special Projects:

Erik Neumann Curator of Education, provided a planting plan for St. Anthony's Methodist Church, Edgeton, MD.

Served as Consultant for U. S. Naval Academy grounds and plantings

Served as member of the Board of Director's, Landscape Design Program, The George Washington University, Washington, DC

Served as designated Media/Community Relations Contact by Dr. W. Klassen, Area Director, Beltsville, MD

Participated in Ohio State Student Intern program. One student from Horticulture Department, Ohio State University.

The Education Department handles all orders for both printing and photographic services. This activity is done by Mary Ann Jarvis, Program Assistant and Coordinator.

## ANNUAL REPORT OF THE LIBRARY - 1984

Members of the Library Committee for 1984 were Chairman Erik A. Neumann, Frederick G. Meyer, Gene Eisenbeiss, Sylvester March, Holly Shimizu and ex-officio Henry Cathey. Delegates from the National Agricultural Library (NAL) were Judy Ho, branch librarian and Special Collections, NAL and Jayne MacLean, Reference Librarian in the Farming and Forestry Branch.

Compact Shelving. Compact shelving was purchased for the stack area of the library from Space Savers of Kensington, Maryland at a cost of \$22,000. This new shelving, installed during the holidays in 1983-84, increased the storage area of the stacks by approximately 70% and was a much needed addition to the library.

Purchases. The purchasing of books and the renewal of serial subscriptions for the library is handled by the Acquisitions Branch of NAL. Selections are made by the Library Committee and are forwarded to NAL by the branch librarian. Funds for book purchases are provided by NAL and funds for serial purchases are transferred to NAL from the Arboretum budget. As in the past, NAL has continued to catalog books for the library. As a result of a major reclassification project undertaken by Jayne MacLean in 1978, all books in the library are classified by the Library of Congress system.

Gifts. The library's collection has continued to grow, in part, due to the generosity of many who have contributed their books and money for books over the year. The City of Philadelphia has made an indefinite loan to the library of a number of old and valuable works. Included in these works are bound issues of The Gardeners' Chronicle, Garden and Forest, and The Garden from the late 1800's, as well as the first edition of Hortus Kewensis published in 1789.

Staff. As of the beginning of 1985, NAL will provide a professional librarian two days a week to manage the library. This position will be filled by Susan C. Whitmore, a reference librarian in the Farming and Forestry Branch of NAL.

Submitted by



Susan C. Whitmore  
Arboretum Librarian  
April 30, 1985

U.S. NATIONAL ARBORETUM WEATHER DATA  
1984

<u>MONTH</u>	<u>MAX. F</u>	<u>Norm.<sup>a</sup></u>	<u>MIN. F</u>	<u>Norm.<sup>a</sup></u>	<u>RECIPITATION<sup>b</sup></u>	<u>Norm.<sup>a</sup></u>
January	61	80	-04	0	1.81	2.92
February	69	82	15	-1	4.19	2.76
March	69	91	18	9	6.07	2.48
April	77	94	29	22	3.43	3.21
May	89	96	36	25	4.65	3.85
June	96	100	42	44	.95	3.92
July	92	104	57	50	5.86	4.05
August	92	102	50	46	3.20	5.30
September	91	102	42	33	1.73	3.42
October	84	94	40	20	3.03	2.75
November	70	87	19	15	3.75	3.14
December	77	74	18	5	1.43	3.20
<hr/>						
12 months	96	104	-04	0	40.10"	41.00

<sup>a</sup> Means for 1946-1970

<sup>b</sup> Inches

Maximum temperatures were generally lower than "normal" in 1984 and minimum temperatures higher.

GARDENS AND COLLECTIONS REPORT

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Annual Research Progress Report 1984  
Living Plant Collections Development, World-Wide Plant Exchange,  
and Plant Life Public Education  
01/84 - 01/85

Two plant explorations to Republic of Korea, added 485 germplasm accessions for Arboretum plant collections and breeding programs; coordinated production of U.S. National Arboretum garden for the 1984 Washington D.C. Flower Show: 60,000 visitors. Obtained 50 Glenn Dale Azalea cultivars to replace missing ones and 75 new Satsuki azaleas for the Lee Garden Collection. Planted 105 4-7' Malus as part of the National Crabapple evaluation Program. Added more than 4000 native plants and bulbs to Fern Valley, restored the Limestone wall and the Entrance Areas. Remapped the Japanese Garden and Bonsai areas. Developed rest area (memorial bench donated by Dr. T.B. Kinney); constructed a new planting bed, which also tests a new weed barrier netting. The National Herb Garden increased its collection of herbs and improved the planting arrangements. Cleared the China Valley area in Asian Valley and planted plants from the 1980 SABE expedition in China. Distributed over 13,000 plants, 7,000 propagules, and 18,000 seed packets. Distributed more than 170 other items to 600 participating institutions. Continued regular service and interaction with the public: monthly mailings of scheduled events to over 5,000 households, institutions, and others; mailings for frequent special events; tours, classes, nature walks, lectures, etc. for many varied segments of national and international life.

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Martin, S.F. 1984. Cover for Conifer Society Bulletin, Vol. 2, Summer, '84. No. 1.

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Shimizu, H.H. 1984. Do Yourself A Flavor. FDA Consumer. April. Publication No. 84-2192.

Shimizu, H.H. 1984. Handy Herb and Spice Primer for Salt Watchers. Chicago Tribune. September 13, 1984.

Yinger, B.R. 1985. Funding and Objectives of Plant Exploration. Longwood Seminar Series. In Press.

Yinger, B.R. and C. Hahn. 1985. Cultivars of Japanese Plants at Brookside Gardens, Part II. Arnoldia: In Press.

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- Neumann, F.A. 1984. National Bird Garden. FONA News: January, 1984.
- Neumann, F.A. 1983. The United States National Arboretum - America's Living Museum. FONA News: November, 1983.
- Neumann, F.A. 1983. Arboretum Home For Rare Japanese Books. FONA News: November, 1983.
- Neumann, F.A. 1984. The Story of the Glenn Dale Azaleas. FONA News: June, 1984.
- Neumann, F.A. 1984. Educating Public Remains On-Going Priority. FONA News: November, 1984.



**PLANT DISTRIBUTION PROGRAMS**  
by Rob DeFeo

The National Arboretum presently exchanges plant materials with over 700 Botanic Gardens, Arboreta, Universities, Nurseries, and other institutions conducting educational or research programs with woody plants. In 1984, over 1,300 plants, 7,000 propagules, and 18,000 seed packets were distributed.

The following Plant Distributions were completed:

1) 1984 Seed List

(154 accessions, 600 foreign institutions)

2) 1984 General Plant Distribution

(43 accessions, 280 domestic, 15 foreign institutions)

3) 1984 Special Distribution, United States National Arboretum Introductions

NA 49767 Camellia x 'Ack-Scent White'  
NA 49768 Camellia x 'Ack-Scent Red'  
NA 49769 Camellia x 'Ack-Scent Pink'  
NA 49770 Camellia x 'Ack-Scent Star'  
NA 49771 Camellia x 'Ack-Scent Spice'  
NA 49772 Camellia x 'Ack-Scent Sno'

(75 domestic institutions)

4) 1984 Herb Distribution

(3 accessions, 50 domestic institutions)

5) 1984 Special Distribution

Select materials collected during the 1982 Plant Exploration to Hokkaido and Northern Honshu.

(15 accessions, 25 domestic institutions)

6) 1984 Special Distribution - Betula uber

(20 domestic institutions)

PLANT EXPLORATION IN 1984

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January 18, 1985

SUBJECT: Overview - Plant Collecting - Korea, 1984

TO: Henry M. Cathey, Director  
U.S. National Arboretum

I would like to take this opportunity to formally thank all those concerned with giving me the opportunity to participate in the 1984 plant explorations to South Korea. In particular, I would like to thank the Friends of the National Arboretum Board and Management for facilitating the funding for these trips. While I have been privileged to participate in several plant explorations to Japan, this was my first trip to Korea. It was different!

The five-year master proposal for collecting in Korea has been well conceived. The 1984 segment was perhaps the most urgent due to threats on the flora from man and beast. Man has cut vast areas of vegetation for fuel and has collected choice herbaceous plants for medicinal purposes and ornamentals for container culture. Beast, namely introduced free roaming domesticated goats, have grazed in natural areas and eradicated choice herbaceous vegetation and prohibited the regeneration of woody material by eating seedlings. Perhaps of even greater concern is the introduction of certain aggressive foreign species for reforestation purposes after the war. One in particular, Robinia pseudoacacia, was planted extensively, is now naturalizing and forcing out the native flora.

There is a ray of hope, however. I came away with the feeling that Koreans do care about their flora and that there is the beginning of a framework of agencies to deal with such things as national parks and plant conservation. There is also support at the federal level, from several universities, municipalities and the private sector for the establishment of arboreta, botanic gardens, display gardens and parks, featuring Korean plants. One must remember how badly ravaged Korea was at the end of the war in 1953. Its priorities during the past 30 years have been to feed, cloth, house, employ and educate its population and to make a giant step into the 20th century. It has done this and can be very proud of its many accomplishments. With a more sophisticated economy and higher standard of living the pressure on the native flora for fuel, medicine and grazing should lessen.

I could not help but share in a very small way the Koreans' great pride in their achievements at the 1984 Summer Olympics. All eyes in Korea were focused on Los Angeles during our summer trip. Certainly the youth of any country are an indicator of the direction the country will take in the future. Wherever we traveled in the countryside, even to the most remote islands 120 miles from the South Korean mainland, we encountered signs for 4H Clubs and well-built schools each with its own meteorological station, a labeled collection of various geological rocks and a modest collection of plants, labeled in both Korean and Latin. Whenever we encountered young people, we found them to be bright, inquisitive, and eager to communicate with us. Three cheers for the youth of Korea.

Henry M. Cathey

A key portion of our 1984 trips required us to travel to several islands near North Korea which are very sensitive militarily and required the cooperation of the Korean military, particularly the Navy for sea transportation and Marines on the islands for land transportation and escorts. Unfortunately, prior to our arriving in Seoul shifts of key personnel on the American side in Korea, both high ranking contacts with the U.S. Navy and the Agriculture Counselor made our arrangements with the Korean Military more time consuming than anticipated. Thanks to persistent efforts by Col. Howerton - our Air-Force Attache and with assistance from the Agriculture Counselor's Office the required authorization and support from the Korean military was obtained. The success of this trip was highly dependent on the support we received from the Korean military, from the high-ranking brass in Seoul, at the Port of Inchon, and at the various islands and jurisdictions to sailors that helped handle our mountain of supplies as we made as many as three transfers from one ship to another at sea, and our marine escorts that provided our land transportation and kept us away from mine fields and other assorted dangers. Not only did we receive support from the entire staff in the Agriculture Counselor's Office and from the Air Force Attache, but also other segments at the Embassy, including the mail room staff for posting packages, the motor pool staff for transportation to the commissary and Port of Inchon at all hours of the day and night, and the administrative staff for our various I.D's and authorization cards. We were delighted at having Dan Conable, the incoming Agricultural Counselor, assume his post at the end of our summer trip and assist with the fall preparations. We were especially appreciative of the assistance received from Dr. Robert Carlson and his Korean staff at the USDA Beneficial Insect Laboratory.

Accomodations in Seoul at the U.S. Embassy recommended hotel, the Westin Chosun, were excellent. The rates were moderate, food and service outstanding. It truly was a home away from home with the staff welcoming us back as grubby as we looked after each field excursion and with our mountain of luggage. Field accomodations were somewhat primitive on occasion, but always acceptable. Local food and water for the most part presented the biggest problem. The water problem was solved rather simply. You did not drink it! There was always Coca Cola and other carbonated beverages available. Local food varied from excellent to intolerable. The food problem was solved by bringing ample supplies with us from the U.S. military commissary in Seoul. The summer trip revealed that electricity was available at all our stops. For the fall trip we were more adequately prepared to handle the food situation with a small inexpensive electric stove. This enabled us to prepare hot food, boil water and keep fit in general.

Weather during the summer trip was exceptionally hot and humid. The intensity of the sun was particularly strong. The chances for dehydration and heat exhaustion were very real. Americans having lived in Korea for 20 years reported it to be the hottest summer they had experienced. Despite the heat and a day of near heat exhaustion for me we managed to get into the field every day except one due to rain. Depending on conditions at sea, we fared the sea journeys accordingly, from delightfully relaxing on deck "cruises" to below-deck torture from the rolling and pounding of the ship. The at sea transfers from one ship to another was mentioned earlier. These experiences were perhaps capped only by a 6:00 A.M. departure during the fall trip. We

Henry M. Cathey

were taken, along with our mountain of luggage, by small rowboat in relays in total darkness to the mother ship amid some degree of confusion. The weather during the fall trip was near perfect. Mild sunny days made every moment outside a joy. Again we had but one day of rain that disrupted our field schedule.

The team concept with expertise in taxonomy and horticulture has proven to be a valid one. The 485 germplasm accessions were nearly totally documented with voucher herbarium specimens. Close to 1,000 herbarium specimens were made. New location sites were documented for several species. These accomplishments were the result of the dedicated efforts of the entire team, each putting in many long hours to achieve this success.

The proposed plan for the subsequent years of exploration in Korea should be followed to complete our collection, and documentation of potentially horticulturally valuable germplasm from this area. The balanced team approach of taxonomist/horticulturist should be followed.

In view of our long-term interest in Korea and in keeping with our philosophy of helping those individuals that seek our professional friendship, I believe we have an obligation to the horticulture/taxonomy/landscape architecture/city planning/environmental protection/commercial horticultural communities in Korea. During our summer and fall visits I felt on numerous occasions that professionals in these fields were reaching out to us - to help us and to learn from us. Unfortunately we allowed very little time for interacting with this important element - people. For the immediate and lasting success of our work in Korea I strongly urge a greater interaction with individuals and institutions representing these communities.

I would like to extend a very special thank you to:

- Our sister institution participants - Darryll Apps, Longwood Gardens, Peter Bristol, Holden Arboretum and Paul Meyer, Morris Arboretum for their hard work in making the trips a success and their good humor in all situations.
- Barry Yinger for his keen knowledge of the Korean flora and his planning for the 1984 trips and the 5 year master plan.
- The Chang brothers, Young June, summer trip, and Young Hun, fall trip, for their tireless efforts on our behalf ranging from dealing with Korean Officialdom in Seoul, to vehicle repair, to dealing with a rice farmer after our vehicle did some minor damage to his rice paddy.
- Our good friend, Kim Un Cho, President, Korean Horticultural Society and entrepreneur extraordinaire. His home became our warehouse. He manned our central command post. He entertained us. He chauffeured us. He treated us to a memorable day in Pusan highlighted by a visit to the U.N. Memorial Cemetery and a visit with the Mayor of Pusan.
- Dr. Tchang Bok Lee, Seoul National University for traveling with us on the first segment of the summer island trips. Dr. Lee assisted with the identification and verification of several herbarium specimens. He also arranged for the use of the University herbarium plant dryers as needed.

Henry M. Cathey

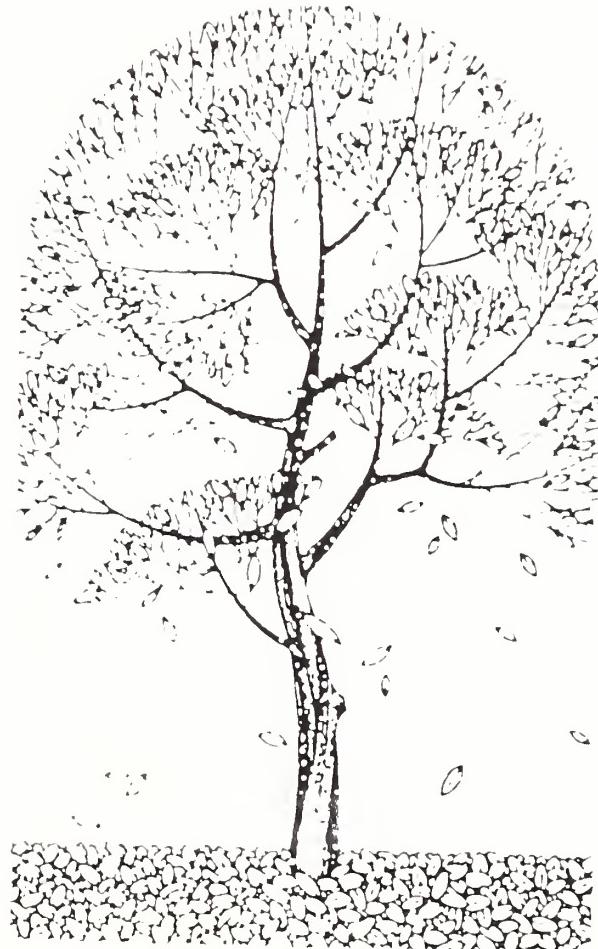
After the somewhat difficult summer trip, the fall trip proved to be a very positive experience. I look upon myself as being an ardent supporter of the country and its people. It was an experience I will long remember and cherish. I would very much like to be considered for participation in any future explorations to Korea.

Gloucester, Pa? October?

SYLVESTER G. MARCH  
Horticulturist

cc:

D. Apps, Longwood Gardens  
P. Bristol, Holden Arboretum  
P. Meyer, Morris Arboretum  
D. Townsend, USNA  
B. Yinger, USNA



## KOREAN EXPLORATION PROGRAM REPORT

by

Barry R. Yinger  
Asian Valley Curator  
April 4, 1985

The 1984 segment of our five-year program of plant exploration in Korea has been successfully completed. This segment, which focused on the northwest coast and islands of the Republic of Korea, was funded through the Friends of the National Arboretum Inc., with grants from the Longwood Foundation, the Martin Foundation, the Morris Arboretum, and the Holden Arboretum. Many people here and in Korea contributed to the success of our program, but special thanks should be given to the Korean Navy, who transported us to and from sensitive islands off the North Korean Coast, and the Korean Marine Corps who helped us on the islands. We also thank Mr. Un Cho Kim for allowing us to use his house to store supplies, and Mr. Young June Chang (Seoul National University) and his brother Yonghun for helping us with planning and field work.

The strategy of organizing two separate trips of about six weeks each, one in summer and one in autumn, served us well. On the summer segment we scouted the best sites for collecting seed, took cuttings of desirable plants (especially sterile individuals), and collected herbarium specimens. We returned to the best sites for collecting in the autumn. The single most striking feature of the coastal and island landscape was how thoroughly disturbed most of it is. Mr. Chang and I had visited many of these sites in 1982, and it is clear to us that destruction is not only continuing but accelerating. In most areas, it is impossible to form any clear impression of what the original vegetation was like, and even in less-disturbed sites it was often difficult to find many trees and shrubs old enough to be sexually mature. The most widespread damage is caused by frequent coppicing of all woody plants for fuel. In heavily populated areas even the organic debris is scraped from the soil to be burned. Thus, the soil becomes very low in nitrogen and extremely acid so that only the strongest species (pines, Miscanthus, Lespedeza) can survive. Further damage is caused by the gathering of plants for medicinal use, so that some groups (ie. Orchidaceae, Araceae, Campanulaceae) are on the verge of extinction in many areas. The introduction of goats in many areas guarantees that regeneration of seedlings will not occur except for tough unpalatable species such as Artemesia. A new and significant danger is the digging of choice woody species (ie. Camellia, Actinidia, Carpinus) for use as bonsai pot specimens, which are now popular and expensive in Seoul. A number of important woody species listed from northwestern Korea by Japanese botanists before World War II are now apparently extinct above 37° N. latitude. Others are nearly gone. It is difficult to find any sign of hope for the preservation of any plant communities in this part of Korea. Because of this, and because several important species occur here at the extreme northern edge of their range, it is essential that a germplasm pool of species from this region be maintained in cultivation.

Our most important collecting sites were these: Kanghwa Island, Paekryong Island, Taechong Island, Sochong Island, Yonpyong Islands, and the Tae'an Peninsula.

Kanghwa Island is a large island reached by bridge from the mainland, lying between Inchon and the Demilitarized Zone. Extensive diking of estuarine marshes has produced vast fields for paddy rice cultivation. This and the pressures of increasing populations have resulted in the nearly total depletion of the native lowland flora throughout the area. One area of steep hills and valleys near Chongsu Temple has been fairly well preserved. Here we were able to collect seed from mature specimens from a rich mix of trees and shrubs that once covered the island. On cut-over low hills we found large populations of exceptional Viburnum erosum, and the only fruiting plant we were to see in the wild of Viburnum sargentii. A striking feature of exposed granite hillsides was Chrysanthemum zawadskii in pink and white forms; this is a tough, disease-resistant plant of great beauty.

Paekryong Island is the most northern island under the control of the Republic of Korea, at 38° N. latitude, within sight of the coast of North Korea. It and its neighboring islands have never been explored by Western plantsmen, and they are now heavily garrisoned because of their great strategic importance. Cutting of forests for fuel and pasturing of goats have already destroyed nearly all the forest plant communities. Paekryong Island is steep and rocky with some of the most impressive scenery in northwest Korea. One site, I Son Am, near Tumujin, is dominated by awe-inspiring vertical stone chimneys and sheer cliffs thrusting up from the ocean and coast. Such sites are home for several important herbaceous ornamentals, especially species of Sedum, Hemerocallis, and members of the Campanulaceae. Important collections of trees and shrubs were made from coppiced regrowth on hillsides and in valleys, including superior forms of Styrax, Euscaphis, and Viburnum. One uncut hillside near the Chonghwa Dong Church allowed us to observe the rich mix of species that was once characteristic of the island. The most northern Korean known plant of Camellia japonica in Korea is here, in Changchon. A magnificent specimen 5 m. tall two years ago, most of the branches have recently been chopped off.

Taechong Island, near Paekryong, was one of the best sites for collecting, although its native flora is also very badly disturbed. One well-preserved hillside at Koju Dong village yielded seed of several choice tree species. The rocky cliffs at Sonae Dong protect large colonies of Viburnum bitchuense, a very desirable species here laden with fruit. Here were also large populations of Pardanthopsis dichotoma, seen by me and Mr. Chang in 1982, but documented from Korea for the first time on this trip. It was previously known from northern China. Dr. Tchang Bok Lee of Seoul National University will propose the site as a national monument. The remnants of the Camellia japonica forests that once covered much of this island were of special interest to us. We collected cuttings and seed from plants in gardens which had originally been dug from the wild in Satan Dong and Sonae Dong. We also collected cuttings from a few coppiced wild plants in Satan Dong and a fenced "monument" site nearby. On the seaside cliffs at Sonjin Dong we were delighted to find a very showy mutant form of Scilla scilloides with a large, much branched inflorescence. This showy, summer-flowering bulb will be a fine addition to Western gardens.

Sochong Island, within sight of Taechong, was our best site for Camellia japonica collections. More than fifty large plants to 6 m. tall, some more than 200 years old, remain on a windswept open slope above Yedong village. This population has also been designated as a "monument" site. We were able

to collect prodigious amounts of seed here. On sheer rock cliffs at Nohwa Dong we took cuttings from coppiced plants on very exposed sites; other trees and shrubs were also collected in a grove above the village. On the opposite side of the island, at Topkol, we sampled variation in extensive colonies of blooming Hemerocallis coreana.

The twin islands of Taeyonpyong and Soyonpyong, within sight of the North Korean mainland, were very difficult to reach, even with the cooperation of the military. Because of its close proximity to North Korea, all civilians have been relocated from the north side to the south side of the island. Thus the vegetation on the north side of Taeyonpyong is less frequently harvested for fuel, and some sites retain interesting plant associations. Here we found large colonies of Lindera salicifolia, described by Nakai during the Japanese occupation from one sterile plant and not reported since. Our many collections of fruiting plants should allow taxonomists to resolve the status of this rare and beautiful shrub. At the same site were unusual variants of Chrysanthemum indicum with orange rather than yellow rays. Other uncommon species were also rather abundant here.

Further south along the coast of the mainland, we explored the Taean Peninsula, a large area shaped like a hand with spread fingers reaching west into the Yellow Sea below Inchon. Our visits here included the nearby islands of Anmyon, Taebaengi, and Ando. In the provincial capital of Taean, where we were based in a rooming house, we observed interesting specimens of trees in cultivation, including Crataegus pinnatifida var. major and Quercus myrsinifolia. In the court yard of a beautiful old Confucian school stood a specimen of Ginkgo biloba with paired fruits which Dr. Lee wishes to designate as a national monument. The Taean Peninsula is hilly, with all lowland areas and most gentle slopes intensively cultivated. As recently as twenty years ago there were stretches of mature forest here, but these are mostly gone or greatly reduced in species diversity. Those forests remaining are nearly pure stands of Pinus thunbergiana, P. densiflora, and their hybrids. On many of the farmhouses we were delighted to see superior forms of Campsis grandiflora with large, flat flowers in strong or pastel shades of orange. At one site on Anmyon Island, we observed a protected grove of Koelreuteria paniculata growing on sand dunes just above the high tide line. On Taebaengi Island, an uninhabited island near the coast, we collected a variety of broadleaf evergreens and unusual herbaceous plants. It was sad to see the myriad craters where fishermen and visitors from Inchon had grubbed out the stumps of Camellia and other plants, leaving the cut branches scattered on the rocks. Some of these were so fresh that we took cuttings from them for propagation.

The 1984 exploration was successful in collecting valuable germplasm of most of the plants we had targeted in advance as important for research. It seemed that in several cases we got there just in time to be able to collect from the last remaining individuals. While the mountainous interior retains large areas of forest in rather good condition, the condition of native plant communities along the coast and on the islands are in a terminal crisis. I am honored to have been part of an effort which, limited as it was, will lead to the better understanding and some preservation of dwindling plant resources.



Kennett Square, Pennsylvania 19348-1000

Department of Education  
Area Code (215) 388-6741

February 26, 1985

Dr. Henry Marc Cathey  
Director, U.S. National Arboretum  
24th & "R" Streets  
Washington, DC 20002

Dear Marc:

Here, finally, are some comments on our summer 1984 Korean plant collection trip. To start with, I want to thank the National Arboretum staff, FONA Board, USNA Advisory Council, and Longwood Foundation for making this trip possible.

After seeing the Korean environment, I became even more convinced of the need for plant collection. Unfortunately, rapid industrialization, population density, and low interest in ornamental gardening has placed the flora of Korea in jeopardy. Wherever we went we saw evidence of plant destruction. This was especially true on the islands where clear cut rotation is practiced and where domestic animals have been allowed to graze. Perhaps as an ornamental industry develops this lack of interest will change, but unfortunately change may come too late.

Paradoxically there does exist potential leadership for preservation. This was the case at all of the schools where special plants were revered in teaching collections, at Seoul's National Museum where we observed some of the world's finest tree repair work and the Forestry Research Institute. Without question their temperate climate flora is one of the richest in the world. In view of the present destruction of native flora it does seem that a repository of Korean plants in the United States is an especially worthwhile venture.

I'd like to discuss the proposal and trip itself. The proposal document for plant collection in Korea, written by Barry Yinger, is first class. My early thought was that it might be too ambitious. However, I changed my mind later. We did reach each of the designated geographical areas and collected most of the target species. The document is systematic, thorough, and very workable. I hope that subsequent year's trips can be financially supported and completed. It is a very good proposal.

Dr. Henry Marc Cathey

February 26, 1985

Our arrival in Korea was as planned but then some difficulties arose with complex U.S./Korean Embassy arrangements. We were delayed over a week, but considering our various complex requests of the Korean navy, marines, and supporting governmental units this was understandable. I offer many accolades to Young-June Chang, our interpreter, for helping us through those complex arrangements. Both Sylvester March and Barry Yinger are to be complimented for their efforts as well. I should also recognize Kim Un Cho, President of the Korean Horticultural Society for his assistance with our gear and arrangements in Seoul.

Once we had reached our collecting destinations the collection operation worked smoothly. A lot of good thought had gone into operations and everything seemed to fall in place. The only possible negative input I might comment on is leadership assignment. I do feel in the future that it is best to assign one individual to be in charge. I don't believe either Sylvester or Barry knew for sure who had the final authority. For the most part this was not an issue but I could see situations where it could be. Another negative point was the rushed nature of most of our collection excursions. It was extremely difficult to accomplish our objectives (especially dig plants) in the prescribed time. Unfortunately this resulted because the military chaperones had an agenda which our objectives had to fit. The intense heat further aggravated the situation. This concern will not be so great on the less military sensitive mainland.

Many of the plants brought back have decided possibilities for ornamental use in the United States. A few that I think are of particular importance are:

1. All of the Camellias. If these are hardier than existing Japanese forms their commercial value will pay for the trip many times over.

2. The Euscaphis japonica seeds brought back from the fall trip have great potential as garden plants. If these seedlings are hardier than others of the species they are especially valuable.

3. Until this trip there has been little representation in the U.S. of the genus Pardanthopsis. In view of the inter-genera cross with Belamcanda, there is even greater potential for the new crop x Pardancanda.

4. The addition of new Hemerocallis species to the National Arboretum collection should have immediate display potential. These plants also have potential to breeders wishing to re-introduce vigor to modern cultivars. The dried botanical specimens should also contribute to taxonomic work. A good key to the species is very much needed.

Dr. Henry Marc Cathey

February 26, 1985

5. With the renaissance of perennial gardening in this country a number of the different genera collected should be of value, especially Gypsophila, Aster, Lilium, Limonium, Platycodon, Lythrum, Clematis heracleifolium, Pennisetum, Adenophora, Dianthus, Liriope, Patrinia, Peucedanum, and Echinops.

6. If one bulb of a uniquely different Scilla scilloides can be vegetatively propagated we may have a unique new commercial summer blooming bulb crop. I suspect The Netherlands market would have special interest in this probable sterile form.

7. The discovery of heavy seeding Lindera glauca var. salicifolia plants will contribute to botanical literature and to the overall ornamental horticulture field. Both male and female forms of this botanical variety are attractive--the seeding potential offers ease in propagation.

8. Finally, many of the Korean plants seem to have unusually thick foliage. One might assume this would indicate air pollution tolerance and the ability to withstand urban conditions. This leaf thickening is especially found in Styrax japonica, Cornus kousa, and Celtis chinensis. There is good potential for ornamental plants from these and other genera.

Lastly I'd like to dwell on the storage, maintenance, and distribution of these plants. I am aware that the National Arboretum budget is finite and so are the budgets of the cooperating organizations. I am concerned that there might not be enough resources available to adequately propagate, line-out, and maintain these plants until they are tested. To that end more consideration and resources may be needed.

Decentralization of the collection to various sites may aid the project, but it will also hinder comprehensive evaluation. Obviously the record keeping (from multiple sites) and reports from these collections could be extensive. Somehow this needs to be dealt with. The problem will become more acute year by year. A "think tank" or "brainstorm" session may be needed to discuss this aspect fully.

Once again let me say thank you for a wonderful opportunity. I assure you that I'll be a strong advocate of the National Arboretum plant collecting program and of many of the individual plants. My bags are as good as packed for the next trip--China is one of many countries high on my priority itinerary lists.

Very truly yours,



Darrel A. Apps  
Department Head - Education

# Morris Arboretum

of the University of Pennsylvania

16 January 1985

Dr. Henry M. Cathey, Director  
U.S. National Arboretum  
3501 New York Avenue, N.E.  
Washington, D.C. 20002

Dear Marc:

I would like to thank you for the opportunity to participate in the U.S. National Arboretum plant exploration trip to Korea this past autumn. As you know, about 250 collections were made, and by now, you probably have seen our species list and are familiar with its contents.

Enclosed is a copy of the January-February 1985 Morris Arboretum Newsletter. This article covers some of the highlights of the trip from my point of view and gives general pictorial coverage. Beyond this, there are a few points that I would like to reinforce.

In 1984 I was fortunate to have the opportunity to travel extensively in both China and Korea. With each trip, I have become more keenly aware of the tremendous diversity of woody plants which are yet to be utilized in American Gardens. In many instances, there are "new" species to be collected and tested. Most of these are known to science, having been catalogued and described fifty or one hundred years ago, although they remain virtually unknown in American landscapes today. One example from our fall collection is Euscaphis japonica. In the field we were impressed with its beautiful, red fruits and its lustrous, green leaves. It is surprising that this highly ornamental shrub has not yet found its way into American Gardens.

Other little known but potentially useful trees were found growing in a variety of difficult environments. Here, they encountered a variety of conditions including salt spray, wind exposure, poor drainage flooding, and sterile soils. Species

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collected from difficult sites are good candidates for Urban plantings where similar problems are encountered. Species found under such conditions include the following:

Acer truncatum  
Alnus mayrii  
Carpinus coreana  
Celtis bungeana  
Celtis chosuneana  
Celtis sinensis  
Platycarya strobilacea  
Quercus variabilis

In other instances we saw the promise of useful variations in relatively well-known species. The potential hardy forms of Camellia japonica quickly come to mind. Also, the seaside form of Styrax japonica may offer greater resistance to salt spray in drought. Variations in plant size and flower color in Rhododendron mucronulatum may prove to be useful.

Certainly, these concepts are not new. Plant explorers have long extolled the wonders of variation in the plant world. What is new to many people, though, is the concept that much remains to be collected from temperate forests. I believe the genetic background of many of our most widely used Asian woody plants is very narrow and imbred. In some cases, we may have only one clone in cultivation. For example, Gary Koller of the Arnold Arboretum, believes most of the Rhodoty whole scandens in the United States are of one clone and consequently do not produce fertile seed. This rugged understory shrub is being considered for extensive understory plantings in Central Park, but there is little available in the nursery trade. Happily, this is a species which we were able to collect in several sites in quantity. It will be interesting to observe the vigor and adaptability of those new populations in our climate.

At the Morris Arboretum we are very pleased with the collections made this year in Korea. The real challenge is now to grow on, evaluate and eventually introduce these to a wider public. We are eager to continue our cooperation with the National Arboretum in years to come, though it will be a year or two before we assimilate this year's collections and are

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ready to take on another expedition. I know many of your staff are likewise stretched, and it may be wise to extend the Korean Collection program over a longer period of time. In time though, we are particularly eager to collect in the Northeast Mountains in the vicinity of Mt. Sorak.

In summary, I feel that the fall exploration was successful beyond our hopes. We made many fine plant collections. Both personally and professionally, it was a growth experience from which I will always draw.

Again, thank you for your help in arranging the trip. I hope we can discuss this further in the near future.

Sincerely,



Paul W. Meyer  
Assistant Director, Horticulture

PWM/ebc

Enclosure

cc: Peter Bristol  
Dr. William M. Klein  
Rick Lewandowski  
Sylvester G. March  
Barry Yinger

# The Holden Arboretum

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January 18, 1985

Dr. Henry M. Cathey, Director  
 U. S. National Arboretum  
 3501 New York Ave., NE  
 Washington, D.C. 20002

Dear Dr. Cathey:

Enclosed is the report you asked for. Again, I would like to express my satisfaction with the organization of this trip. Barry Yinger and Skip March had made adequate arrangements for supplies, travel and accommodations. Being at the mercy of the Korean government's permission to travel to the islands and for transportation created occasional anxieties, but the expedition members worked around it as best as we could.

Having two support members, as Paul and I were, worked well, and more collecting could be accomplished without inconvenience to other members. I would encourage you to try to have four on the collecting teams.

The five phase collecting proposal is still valid. It provides adequate time to make large seed collections, as well as collections representative of the flora. Mr. Yinger's knowledge of the areas made the search for plants more efficient. During the summer trip, areas could be reconnoitered for the fall trip.

According to the original proposal we have completed phase one. I would like to continue adding to the Korean flora of The Holden Arboretum by further participation in these expeditions. Keeping in mind our climate, the next logical trip for the Arboretum to participate in would be the northeast, or the Sorak-Odae area. I collected there in 1981 for three short days and know the potential of the flora.

Thank you for considering The Holden in this very important study of ornamental plants from Korea.

Sincerely yours,

Peter W. Bristol  
 Horticulturist

PWB:pd  
 Enclosure

REPORT ON FALL PLANT COLLECTING  
EXPEDITION TO KOREA

By Peter W. Bristol

From October 1 until November 1, 1984, I represented The Holden Arboretum on a plant collecting expedition coordinated by the U.S. National Arboretum to South Korea. The areas explored were islands and adjacent coastline in the northwest region. The trip was the first of five phases proposed by the National Arboretum to exhaustively explore the Korean flora for plants that have ornamental value, or could be used in an ornamental breeding program. Both seeds and plants would be collected and vouchered by herbarium specimens. In addition, herbarium specimens of selected species would be made to document flora at the collecting sites.

The northwest island trip was organized by Mr. Barry Yinger using his knowledge of the Korean flora and personnel to facilitate transportation arrangements and identify key sites for collecting. The following plants with the purpose for collecting were determined as target species:

Acer mono (truncatum) complex - hardiness  
Camellia japonica - hardiness  
Elaeagnus macrophyllus - hardiness  
Euscaphis japonicus - hardiness  
Euonymus japonicus - germ plasm  
Euonymus fortunei - germ plasm  
Koelrueteria paniculata - germ plasm  
Meliosma myriantha - hardiness  
Meliosma oldhamii - hardiness  
Rhodotypos scandens - new germ plasm  
Rhododendron mucronulatum - new flower colors  
Sapium japonicum - hardiness  
Styrax japonica - larger flower, pollution tolerant leaves  
Viburnum bitchuense - new germ plasm  
Viburnum erosum - new germ plasm

Personnel selected to participate were Mr. Sylvester G. March and Mr. Barry Yinger of the National Arboretum; Mr. Paul Meyer, Morris Arboretum, and myself.

The expedition was based at the Chosun Hotel in Seoul. Forays to predetermined sites were taken by a rented van, or by ship. Mr. Kim, Un Cho was overly generous with his time and facilities. A room in his house was set aside to warehouse plant collecting and herbarium supplies and was the staging area to prepare for each trip in the field and to off load extra supplies at the end of each trip.

The U. S. Embassy supported the expedition by negotiating with the Korean forces to 1. secure permission to visit offshore islands and 2. secure Naval transportation to these islands. The Embassy also provided identification cards so supplies could be purchased at U. S. military bases, money could be converted to local currency, and Embassy transportation could be used for travel to and from Naval ships. Mailing of seeds and plants was

also done by the Embassy.

Mr. Yinger established a schedule for collecting based on his experiences from earlier expeditions. After two days in Seoul, the plant explorers loaded into a minivan and drove to Kwangwa-do. All collecting was done in the southern portion of the island centered around Sagiri and Sonduri. The target species collected were Viburnum erosum, Viburnum bitchuense, Styrax japonica, and Acer mono. Plants of interest for The Holden Arboretum were Wikstroemia, new germ plasm; Alnus mayrii, Carpinus laxiflora and Carpinus coreana for new germ plasm and small tree study; Crataegus pinnatifida for edible fruit.

The next field trip was to the islands of Paekryong-do, Taechong-do and Sochong-do which are approximately 200 km (109 miles) northwest of Inchon. The first collecting was done on Taechong-do. More collected species were checked off the target list: Euscaphis japonica and Camellia japonica. Other plants of interest for The Holden Arboretum were: Malus baccata and Alangium, new germ plasm; Sorbus alnifolia, germ plasm and ornamental value; three Celtis species, street tree evaluation and ornamental value; Pinus thunbergii, hardiness; Euonymus alatus, ornamental value.

A one-day trip to Sochong-do yielded a very large collection of Camellia japonica and Viburnum bitchuense, and seed from an excellent Acer mono. The Paekryong-do collections added Meliosma myriantha and Rhodotypos scandens to the target list checkoff. Other new collections of interest included Photinia villosa, ornamental value; Pinus thunbergii, hardiness; Cyrtomium falcatum and Euonymus xylophyllus, new germ plasm.

A scheduled two-day trip to Yonp'yong island was shortened to one day due to a change in transportation plans by the Korean Navy. Lindera salicifolia was an important collection for future study of ornamental characteristics. Pinus thunbergii was also collected for hardiness, and Euonymus fortunei was checked off the target list.

The last trip was to the Taean Peninsula by minivan. Centered in Taean, we explored sites to include Wonbuk Myon, Anmyon-do and Chollipo. The remaining items on the target list were found: Elaeagnus macrophyllus, Koelreuteria paniculata, Meliosma oldhamii, and Rhododendron mucronulatum (multiple flower colors). In addition, The Holden is particularly interested in Crataegus pinnatifida var. major for edible fruits, Ulmus parvifolia var. coreana and Gleditsia japonica for new germ plasm, Vaccinium oldhamii for edible fruits and ornamental value, Vitex rotundifolia for hardiness and new germ plasm.

In total, 249 accessions were made consisting of both plants and seeds. One-fourth to one-third of the seeds from requested species were given to The Holden and are presently in various stages of stratification and/or germination. The subsequent plants will make excellent additions to the collections and will be evaluated. Surplus seed over the requirements of the Arboretum will be given to interested and cooperating nurseries in Lake County, Ohio, for evaluation.

It is my understanding that the University of Seoul will receive duplicate herbarium specimens and a few packets of seeds collected specifically for them. Mr. Yinger represented the expedition in any discussion with University personnel. There was no discussion between expedition members and horticultural agencies or governmental departments involved in land use or planning, except one last minute trip to Pusan organized by Mr. Kim, Un Cho.

It is self-evident that North America will gain by the introduction of new germ plasm into commercial horticulture from this expedition, but I feel that Korea, a country that is in rapid economic growth and development, will gain little. Korea is a country that has concerned itself about agricultural self-subsistence and exhibited little concern about the ornamental value of plants. With a larger economic base and better education, more people will become aware of ornamental horticulture and an improved quality of life. This expedition could have established some of the initial groundwork to advise professionals and government personnel on proper horticultural development and land use.

In this same light, all members of the expedition were horrified by the total coppicing of the native island vegetation which, over time, will alter and destroy species and habitats, and increase soil erosion. We were equally frustrated that we could not share our expertise with professionals to encourage proper land management practices to the appropriate agencies. To collect plants because their population is in danger of extinction is important, but more important is to advise government agencies on how to prevent habitat destruction.

These expeditions should continue, but time should be scheduled to share our knowledge and discuss with Koreans ways to improve ornamental horticulture and protect unique habitats. The Holden Arboretum has richer collections because of the trip, and we will evaluate and select new plants for commercial introduction to offer the horticultural world more diverse plant material. We would like to support the phase of the U. S. National proposal that will send plant collectors into the northeast section of Korea.



## PLANT EXPLORATIONS PLANNED/PROPOSED

April 8, 1985

TO: H.M. Cathey  
Director

Subject: Proposal for Exploration and Introduction of Documented Woody Plant Germplasm from the People's Republic of China for Research, Germplasm Depository/ Conservation, Landscape and National Nursery Industry Purposes.

Objectives: To discover, introduce documented woody plant germplasm for potential research and landscape purposes significant in northern U.S. ( $39^{\circ}$ - $49^{\circ}$  lat., U.S.D.A. Hardiness Zones 3-7), and to develop and maintain broad based gene pools and germplasm depositories essential for immediate and long-range woody plant diversity and enhancement.

Proposed Exploration Localities: People's Republic of China, "Northern Crescent Provinces",  $35^{\circ}$ - $50^{\circ}$  lat., and selected mountainous regions,  $30^{\circ}$ - $35^{\circ}$  lat.

Priority Target Genera of Immediate Research Import: Betula, Fraxinus, Magnolia, Ilex, Viburnum, Hibiscus, Lagerstroemia, Sophora, Salix, Alnus, Acer, Tilia, Ulmus, Zelkova, Koelreuteria, Phellodendron, Quercus, Aesculus, Syringa, Prunus, Malus, Sorbus, Conifers (especially Cathaya, Tsuga, Abies), Stewartia, etc. (For these the extant gene pool is narrow and limited. For expanded productive research, wild-origin and documented (i.e. description of collecting sites and morphological features, with herbarium vouchers, etc.) new germplasm is essential.) Cf. Appendix. List of generic and specific potentials is essentially unlimited.

Duration: 1986-1990; 5 years (renewable). Exploration every other year; reciprocity for Chinese Scientists in intervening years.

Estimated Budgetary Needs:

<u>Year</u>	<u>Function</u>	<u>Recurring</u>	<u>Non-Recurring</u>
1986	Upgrade facilities & personnel.	---	\$ 102,600
	First negotiation trip to PRC.	---	\$ 2,750
			Total = \$ 105,350
1987-1988	Personnel salaries.	\$ 52,000	
	Maintenance, overhead, supplies, inflation of U.S. operation.		\$ 6,700
	1st Expedition to PRC		\$ 39,650
		Total = \$ 52,000	Total = \$ 46,350

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<u>Year</u>	<u>Function</u>	<u>Recurring</u>	<u>Non-Recurring</u>
1988-1989	Salaries, maintenance, overhead, supplies, inflation of U.S. operation.	\$ 58,300	
	Second negotiation trip to PRC	\$ 2,750	
	Reciprocity for Chinese in U.S.		\$ 36,900
	Total =	\$ 61,050	Total = \$ 36,900
1989-1990	Salaries, overhead, supplies, maintenance, inflation of U.S. operations.	\$ 62,600	
	Outplanting of materials		\$ 10,000
	2nd Expedition to PRC	\$ 26,200	
	Total =	\$ 88,800	Total = \$ 10,000
1986-1990	TOTAL =	\$201,850	TOTAL = \$198,600

From:

T.R. Dudley  
 Research Botanist

&

A.M. Townsend  
 Director of Research

## PLANT EXPLORATION IN THE PEOPLE'S REPUBLIC OF CHINA

SUBJECT: Proposal for Exploration and Introduction of Documented Woody Plant Germplasm from the People's Republic of China for Research, Germplasm Depository/Conservation, Landscape and National Nursery Industry Purposes.

PURPOSE: To discover and introduce documented woody plant germplasm for potential research and landscape purposes significant in northern U.S. ( $39^{\circ}$ - $49^{\circ}$  lat., U.S.D.A. Hardiness Zones 3-7), and to develop and maintain broad based gene pools and germplasm depositories essential for immediate and long-range woody plant diversity and enhancement.

Priority Target Genera of Immediate Research Import: Betula, Fraxinus, Magnolia, Ilex, Viburnum, Hibiscus, Lagerstroemia, Sophora, Salix, Alnus, Acer, Tilia, Ulmus, Zelkova, Koelreuteria, Phellodendron, Quercus, Aesculus, Syringa, Prunus, Malus, Sorbus, Conifers (especially Cathaya, Tsuga, Abies), Stewartia, etc. For these the extant gene pool is narrow and limited. For expanded productive research, wild-origin and documented (i.e. description of collecting sites and morphological features, with herbarium vouchers, etc.) new germplasm is essential. Cf. Appendix. List of generic and specific potentials is essentially unlimited.

JUSTIFICATIONS:

- A. Immense need exists for expanded documented germplasm diversity adaptable to U.S.D.A. Zones 3-7; ie. Great Plains, Great Lakes, etc.
- B. China is vastly richer in potential research and landscape taxa than Japan or Korea, the two current emphases at NA. China contains immense generic, specific, infraspecific, microhabitat, ecotypic, and geographic genetic diversity and phenotypic variation. Example: Acer in China prior to 1949 had c. 70 species of which only 25% are in cultivation; from 1949-1981 an additional 65 species new to science have been described, none of which have been introduced.
- C. China is rapidly "opening up"; however, historical and political analyses indicate future may always be unpredictable. The 1980's provide very viable opportunities to explore and collect wild-origin documented germplasm. Many individual and institutional contacts, as well as those of Chinese Delegations having visited NA, are already in place. Number of contacts will increase as a function of 1985 FONA Delegation to PRC, and a projected 1986 invitation to Nanjing. Preliminary negotiations essential for this proposal can proceed in China in 1985-1986.
- D. From mid 1970's into the 1980's, systematic plant exploration by Chinese scientists, for purposes of Flora of China and search for potential economic plants, i.e. medicinals, has accelerated greatly. Central and provisional government policies emphasis on plant sciences and explorations present unprecedented opportunities for collaborative and joint scientific exchanges and expeditions to remote and previously unexplored (and "sensitive") areas which have been completely closed in the past to non-Chinese.

- E. Chinese germplasm introduced in late 19th-early 20th centuries is of limited diversity and genetic variation/flexibility (often introductions from only one population or even one plant!). The potential of many earlier materials has been exploited and realized, and they have become obsolete for research and/or landscape purposes, and much has died-out.
- F. Urgency: Population pressures and economic policies in China are greatly accelerating habitat destruction by deforestation (with limited reforestation or natural regeneration), medicinal plant exploration, agricultural plot proliferation, erosion, etc. These factors are producing astounding quantities of threatened, endangered and extinct taxa.
- G. National Arboretum emphasis on world-class living collections of hardy documented Asiatic plants for research, education, demonstration, distribution, and germplasm depository of maximum diversity: Japanese plants (earlier and projected exploration for wild and cultivated germplasm, the emphasis perhaps being more on cultivated) and Korea (current and projected for wild germplasm). The basis of current NA/ARS collections of documented wild-origin Chinese woody plants is c. 650 germplasm accessions from 1980 Sino-American Botanical Expedition, the first ever US/PRC joint plant exploration and botanical research exchange program. Urgently need to enrich/enhance NA/ARS germplasm availability of Chinese plants, and to expand and complete NA "China Valley" sections of Asian Valley.
- H. Potential utilization of expedition products from northern and selected sites in central and western provinces for: (1) new adaptability and/or improved tolerance (resistance) to stress factors: a) cold; b) drought; c) heat; d) salt; e) pollution; f) pathogens; g) "acid rain"; h) wounding/improved wound compartmentalization, etc.; (2) superior/improved or previously unknown floral, fruiting, growth form, foliage, etc. characteristic to ameliorate landscape utilization resources; and (3) ultimately, controlled hybridization of wild-origin germplasm of genera, species, infraspecific taxa and provenance/ecological selections between and among themselves and/or with extant germplasm for enhancement of gene pool, leading to superior hybrid progeny.

Wild-origin germplasm, as a rule, offers enormous genetic potentials, far greater than that of cultivated origin having limited genetic potential. Potential utilization in NA/ARS germplasm enhancement research programs for improvement of: (a) native U.S. Plants, and (b) extant foreign introductions with narrow genotypic and phenotypic flexibility and capability due to very limited availability of wild-origin material. Exploration in PRC presents unique opportunities to systematically sample and introduce geographic, ecological and provenance diversity within and between taxa leading to: (a) expand quantity and quality of desirable botanical taxa for research, education and commercial purposes, well above current national inventory; (b) enrich/enhance hybridization reservoirs essential to broaden ranges of adaptation to stress factors; and (c) implement concepts of germplasm conservation and national depositories which are essential for productive research.

- I. Improve, expand and perpetuate US/PRC mutually beneficial scientific exchange programs (personnel, germplasm, literature, etc.) and cooperative/collaborative research.

- J. Enhance national and international reputations and scopes of NA/ARS by:
  - (a) expanding and maintaining world-class, bench-mark living and research collections of documented Chinese wild-origin woody plants; and (b) expanding and maintaining germplasm resource availability and national and international distribution programs. NA presently is the only North American arboretum/botanic garden with a comprehensive distribution program, especially significant to the National Nursery Industry. NA has also been reported publicly by private sector specialists as having the only viable plant exploration program in the nation.
  
- K. Organize and establish cooperative programs for seed and/or plants of expedition germplasm distribution to regional USDA stations, for example in Great Lakes, Central States, Great Plains, etc.; areas for evaluation and testing to insure maximum utilization and potential realization. This type of program is essential. Develop an Index Seminum (Seed List) for distribution of seed of expedition germplasm to other domestic and foreign Botanical Gardens, Arboreta, research facilities, etc. This type program is highly recommended.

SPECIAL PROTOCOL NOTES: Policy for reciprocity and mutually beneficial US/PRC Scientific Exchanges.

Stress: It is doubtful if Western explorers will, for many years be allowed to explore without "assistance" of a Chinese team. Delicate negotiations with PRC ministries, Provincial governments and Botanical Institutes, are absolutely essential to guarantee exploration authorizations and success. Negotiations must be fully supportive of and committed to mutually beneficial and joint scientific exchange, cooperation and reciprocity. Any exploration proposal must incorporate and implement concepts and reality of equal sharing of all exploration products and funding of scientific reciprocity.

Emphasize: Chinese negotiators and authorities insist on scientific exchange and reciprocity. They further express that it is a privilege for foreign scientists to be permitted to explore and work in their country. They will guide negotiations in aid of mutually beneficial explorations and scientific exchange programs along lines in their best interests. For example, the reciprocity provision for U.S. Visits by Chinese scientists is never negotiated with a 1 to 1 time factor; more likely at a 1 to 2 or 1 to 3 level.

Note: The time necessary for written and face to face negotiations should be 1 to 2 years before exploration is scheduled. The reciprocity time for Chinese to be in the U.S. must be negotiated to occur in years alternating with the exploration years. The U.S. funding for negotiation trips to PRC is built into the budget.

GENERAL PLAN OF WORK: Initial policy, planning, financial decisions and implementation.

1. 1986 - Upgrade facilities and staffing needed to take fullest advantage of Chinese germplasm.

The present (1985) facilities and staffing at NA are inadequate to process and follow through with the germplasm products from proposed explorations in PRC. If this exploration proposal is to be considered seriously, policy decisions and funding measures must be initiated to guarantee appropriate and maximum research, collection enhancement, and distribution and utilization scopes of resulting germplasm. The weak links at NA presently are inadequate facilities and personnel to handle and expedite follow-through of germplasm. NA resources are now severely overtaxed and more exploration germ-

plasm should not be considered without the policy decisions and funding to proceed effectively to guarantee optimum significance. Such decisions and funding must be scheduled on a recurring annual basis if this or other germplasm exploration programs are to be of maximum significance to ARS/NA research, depository programs, the National nursery industry, and, ultimately, the consumer. These categories of policy, funding decisions and personnel additions should be committed and initiated before any actual field explorations are scheduled.

2. 1986 - First negotiation trip to Beijing and a provincial capital to present and negotiate proposal with Chinese officials.
3. 1987-1988. Autumn for 3 months, first field trip; priority Heilongjian/Julin (Manchuria) Provinces.
  - A. Projected 5 year plan, renewable for another 5 years, with field explorations to take place every other year, and Reciprocity for Chinese Scientists in U.S. in the intervening years.
  - B. Provinces to be explored are in "Northern Crescent",  $35^{\circ}$ - $50^{\circ}$  lat. 1 , and selected mountainous regions,  $30^{\circ}$ - $35^{\circ}$  lat. 2 . 1987-1981-1st expedition: Heilongjiang/Jilin (Manchuria) 1 ; 2nd expedition - Liaoning-Hubei-Peninsular Shandong 1 ; 3rd expedition - N. Gansu-Shanxi-N-Shaanxi-Ningxia 1 ; 4th expedition - NE & S. Qinghai - N. Xinjiang 1 (N. Xinjiang is Chinese Tian Shan); 5th expedition - Henan - S. Gansu - S. Shaanxi 1-2 ; 6th expedition - Selected locations in NW Hubei (north of Yangtze, i.e. Shennongjia Forest District) - NE Sichuan 2 ; 7th expedition - Selected locations N & W Sichuan-NW Yunnan -- into E. Xizang (Tibet) 2 ; 8th expedition - For Cathaya and associated species; NE-Guizhou-NW Hunan-SE Sichuan-SW Hubei ( $28^{\circ}$  lat. &  $109^{\circ}$  long.) 2 ; 9th expedition - etc.
 

Ultimate designation and accessibility of priority areas will be determined by US/PRC negotiations, not by statement and presentation of U.S. wishes and priorities.
  - C. 1987-1988 Expedition Staffing: 2 individuals (1-3 possible, 2 ideal). Participant 1: Expedition Coordinator/Leader - Category 1 Research Scientist-Taxonomist with some horticultural training, experience and interest and preferably with field experience and floristic knowledge of China. Participant 2: Horticulturist with some botanical/taxonomic training, experience, interest with some field experience. = "Germplasm Specialist".
  - D. Stage 1 (1st Year) Expedition to Heilongjiang/Jilen (Manchuria) Provinces in Autumn for 3 months to collect germplasm and herbarium specimen vouchers.

As plans progress for successive expedition stages, 2 trips per year one in the Spring-Summer and one in the Autumn, to the same location/Province could be developed for reconnaissance, evaluation, documentation, and germplasm collecting at different seasons.
4. 1988-1989. Reciprocity for 2 Chinese Scientists to be in the U.S. for 6 months at NA and/or other locations in ARS. The reciprocity

plan is essential for any exploration to go forward and optimum negotiated arrangements for Scientific Exchange and Cooperation could reduce exploration expenses in China.

ESTIMATED BUDGETARY NEEDS. Estimates are flexible for actual expedition costs depending on negotiations for mutually beneficial exchange and cooperation programs.

A. 1986 - Upgrade facilities and personnel.

1. 1 new equipped polyhouse specifically for processing/ propagating incoming germplasm at NA.	\$ 25,000.00
2. Preparation of initial 10 acres for NA germplasm Depository at BARC.	\$ 600.00
3. Development/expansion new nursery space, cold frames lath facilities at NA.	\$ 25,000.00
4. First negotiation trip to Beijing and Provincial capital; (including 8 days per diem, banquet costs, and round trip airfare.	\$ 2,750.00
5. Additional personnel to man expedition and germplasm depository facilities.	
a) "Germplasm Specialist, GS11 (not necessarily a Ph.D.) to coordinate, supervise, etc. NA wild germplasm operations.	\$ 25,000.00
b) Support Assistant/Technician, GS-7/9 (or WG).	\$ 15,000.00
c) Wage-grade field worker for BARC Depository/NA operations.	\$ 12,000.00
Subtotal 1-5; A. 1986 =	\$105,350.00

B. 1987-1988 - U.S. facilities operations.

1. Recurring salaries for 5 (a-c) above under A.	\$ 52,000.00
2. BARC Maintenance for NA Germplasm Depository at BARC	\$ 1,000.00
3. Overhead for NA greenhouse, polyhouse, etc.	\$ 2,500.00
4. Supplies, i.e. pots, potting medium, fertilizer, etc.	\$ 1,500.00
5. 3% inflation	\$ 1,700.00

Subtotal 1-5: B. 1987-1988 U.S. Facilities = \$ 58,700.00

C. 1987-1988. First Actual Autumn Expedition 3 Months.

* 1. Essential equipment and supplies (paper goods, collecting and camping equipment, etc.) packing supplies and shipping sea freight	\$18,000.00
2. Round trip airfare for 2	\$ 3,600.00
** 3. Internal transportation for 2 in PRC	\$ 3,000.00
** 4. 15 days per diem for 2 at major urban center, i.e. Beijing and provincial capital(s) at c. \$80 per	\$ 2,400.00
** 5. 75 days per diem in field for 2 at \$35 per	\$ 5,250.00
** 6. Hiring of Chinese collecting assistant(s), translator, if necessary, from provincial Botanical Institute or Academia Sinica.	\$ 1,000.00
7. Packing and shipping supplies, freight agents, postage, etc. for returning collections to US/NA	\$ 2,200.00

8. Contingency funds (including \$1000 for hosting essential Banquets)	\$ 3,000.00
9. 3% inflation	\$ 1,000.00

Subtotal 1-9: C. 1987-88 Expedition = \$ 39,650.00

\*Item 1: Much of essential equipment and supplies pertinent first year succeeding plans. Some natural attribution which would require for an expenditure of only \$2,000-\$3,000 or less in succeeding years. All reusable supplies and equipment to be stored in PRC following completion of each Stage.

\*\*Items 3,4,5 & 6 depend on reciprocating negotiations for "IN KIND" arrangements could be considerably reduced, possibly by as much as \$11,000-\$12,000. The "savings" then to be applied to reciprocity for Chinese in U.S. in 1988-89.

D. 1988-1989. Recurring US/NA/BARC Operations.

1. <u>Recurring</u> Salaries for 5 (a-b) under A above	\$ 52,000.00
2. <u>Recurring</u> BARC Maintenance for NA Germplasm Depository at BARC	\$ 1,000.00
3. <u>Recurring</u> overhead for NA greenhouses, etc.	\$ 2,500.00
4. <u>Recurring</u> supplies, pots, etc.	\$ 1,000.00
5. <u>Recurring</u> Second Negotiation trip to China	\$ 2,750.00
6. 3% inflation	\$ 1,800.00

Subtotal 1-6: D. 1988-1989 Recurring U.S. = \$ 61,050.00

E. 1988-1989 - Reciprocity for 2 Chinese Scientists in U.S. for 6 months.

1. per diem @ \$65 per	\$ 23,400.00
2. internal transportation	\$ 3,000.00
3. stipend \$1000 per	\$ 2,000.00
4. 3% inflation	\$ 850.00

Subtotal 1-4: E. 1988-1989 Reciprocity = \$ 36,900.00

F. 1989-1990 - U.S. Operation.

. Recurring Salaries	\$ 52,000.00
4. Recurring overhead for NA operations, etc.	\$ 2,500.00
5. Recurring supplies, pots, etc.	\$ 1,000.00
6. 3% inflation	\$ 2,100.00

Subtotal 1-4: F. U.S. Operations = \$ 72,600.00

G. 1989-1990 - Recurrent: 2nd Actual Expedition

1. Essential supplies and equipment	\$ 6,000.00
2. All other expenses	\$ 19,450.00
3. 3% inflation	\$ 750.00

Subtotal 1989-1990: G. Recurrent 2nd Expedition = \$ 26,200.00

APPENDIX: Examples of Priority Genera:

Koelreuteria - need from northern sources; better habit and form, more rapid growth.

Phellodendron - demonstrates good pest resistance; need upright habit.

Cathaya - recently discovered "living fossil" conifer, unknown in cultivation.

Tsuga - introduce recently described species; pathogen resistance.

Abies - introduce recently described species; widen scope of species for landscape use.

Ulmus - of special interest; introduce recently described species; documented wild origin germplasm essential for research on Dutch elm disease as most Asiatic species show high, but variable, degrees of resistance.

Acer - introduce recently described species; new desirable characteristics; pathogen resistance.

Alnus - introduce recently described species; need tree forms.

Tilia - introduce new germplasm and recently described species; extant genotypes in cultivation of narrow variability. Asiatic species virtually unknown; introduce germplasm with tolerance for wet sites.

Quercus - many new taxa for introduction; need upright species similar to native Q. imbricaria.

Betula - need representative provenance collections for newly described and older species; genus from Asia poorly represented in the west.

Fraxinus - need improved landscape species; could be extremely useful in development of borer-resistance; very few asiatic species in cultivation.

Zelkova - introduce recently described taxa; wild-origin documented material, for example of Z. schneideriana, urgently needed as only 1 mature tree in U.S.

Salix - introduce recently described species; resolve problem of S. babylonica as China is its natural home, but in cultivation there is only 1 clone - a female; need greater diversity of both sexes; also S. matsudana.

Magnolia - introduce recently described species, and more documented provenance material of older taxa; genetic diversity very limited in cultivation. For example, a Wilson accession, at turn of the century of M. sprengeri gave rise to cultivar 'Diva', but nothing more to evaluate and research from Hubei Province.

Albizia - improved hardiness, pathogen resistance.

Hibiscus - hardiness needed; especially urgent to introduce H. sinensis.

Ilex - landscape diversity with new describable characteristics; urgently need cold-hardiness; introduce recently described species.

Lagerstroemia - tall shrub diversity, need more cold hardiness and disease resistance.

Viburnum - need to expand landscape utilization in the north with new desirable features; introduce recently described taxa.

Syringa - better growth forms; hardiness.

Malus & Prunus - expand versatility of small landscape trees with different and unusual phenotypic features.

Aesculus - Asiatic species virtually unknown in cultivation, broaden gene pool.

List could be greatly expanded, emphasizing hardiness and other stress resistance to include among others: Rhododendron, Cotoneaster, Crataegus, Rosa, Photinia, Sorbus, Osmanthus, Spiraea, Abelia, Amelanchier, Aronia, Buxus, Styrax, Carpinus, Cladrastis, Clethra, Cleyera, Ternstroemia, Eurya, Cornus (for insect and disease resistance), Corylus, Davida (for the north), Deutzia, Euonymus, Eudia, Fagus, Gordonia, Hamamalis, Hydrangea, Hypericum, Idesia, Itea, Jasminum (for the north), Juniperus, Juglans, Koelkivitzia, Lindera (for the north), Lithocarpus, Lonicera, Myrica, Nandina, Nyssa, Pieris, Enkianthus, Pistacia, Pittosporum (for the north), Platanus, Populus, Potentilla, Pyrus, Rhamnus, Symplocos, etc. Also, many endemic genera such as Rehderodendron and monotypic genera such as Sargentodoxa. Enormous commercial demand for improved and/or hardy bamboos either from wild or from numerous authenticated and documented bamboo collections at Botanical Institutes in PRC. Growing commercial demand for species and authentic cultivars of aquatic plants, i.e. Lotus, Nymphaea, Nelumbo, Brasenia, etc.; largest collection of these in the world exist in several Botanic Institutes in China.

## USNA PLANT EXPLORATION IN THE REPUBLIC OF KOREA

YEAR 3, 1986

## Cheju And Ullung Islands

The 1986 program of plant exploration in the Republic of Korea is the third year segment of our five-year plan described in detail in our 1983 proposal Plant Exploration in the Republic of Korea. The third year focuses on two large islands: Cheju\* ( $33^{\circ} 20'$  N. latitude) and Ullung\*\* ( $37^{\circ} 32'$  N. latitude).

Cheju is the largest Korean island, about 75 km. long, lying off the southern tip of the Korean peninsula. The island is dominated by Halla Mountain (1950 m.), a dormant volcano which is the highest point in South Korea.

Ullung Island is the only important island off the east coast of Korea. It is roughly triangular, about 12 km. across. Its highest peak is Song-in Bong (984 m.).

Both of these islands are of great interest to American botanists because of their long isolation and the great number of endemic species native there. Ernest Wilson visited both islands in 1919, and both have since been visited by several other Western collectors. The Japanese botanist, Nakai, gave special attention to Ullung Island during the Japanese occupation, culminating in the publication in 1918 of a monograph of the island's flora in which he identified more than thirty endemic taxa, including species in important genera such as Acer, Prunus, Fagus, Phellodendron, Syringa, Cotoneaster, Tilia and Ligustrum.

\* Also known as Quelpaert Island.

\*\* Also known as Dagelet Island or Takeshima.

The flora of both islands is in somewhat better condition than much of Korea. Parts of both islands at high altitudes are protected, and most species in those areas are not in great danger. At middle and especially low elevations, there is much more disturbance, aggravated by the increased popularity of both islands among tourists. The rush to develop Cheju Island as a major year-round resort and easier transport to Ullung for summer holidays will put increased pressure on fragile plant communities. Extensive collecting of certain herbaceous genera (Lilium, Asarum, Hosta, orchids) for the Japanese and domestic nursery trade will soon result in the depletion of many species.

Our exploration program will continue to focus on "target species" selected to advance research in the development of superior landscape plants at the U.S. National Arboretum and cooperating institutions. We will also strive to select species to enrich our living collections and document the flora of target regions by collecting herbarium specimens.

Despite the rather small area to be covered in 1986, a very wide range of species can be collected. Because of the great variation in elevation on the islands, collections can be made with a wide range of cold-hardiness potential, USDA hardiness zones 5 to 9. Ullung Island, in particular, seems to be a refuge for species with unexpected cold-hardiness. Wilson collections from Ullung thrive at the Arnold Arboretum, Jamaica Plain, Massachusetts.

The following species will be targeted for active research programs at the U.S. National Arboretum:

1) Viburnum:

V. awabuki: high-altitude collections on Cheju Island.

V. carlesii: from long-isolated populations on Ullung Island.

V. furcatum: isolated populations from Cheju and Ullung Islands.

2) Syringa:

Syringa venosa: endemic from Ullung Island.

3) Prunus:

Prunus yedoensis: probably the only truly wild populations of this Cheju Island species (probably endemic).

Prunus takesimensis: rare species endemic to Ullung Island.

Prunus serrulata var. quelpaertensis: endemic variety on Cheju Island.

Prunus pendula var. ascendens: from Cheju Island.

Prunus buergeriana: Cheju Island species (only site in Korea).

Prunus lannesiana f. nudiflora: Cheju Island endemic forma.

Other desirable species can be expected from Cheju Island.

4) Malus:

Malus micromalus: Cheju Island native, probably endemic.

5) Ilex:

Ilex crenata: Alpine forms from Cheju Island for dwarf habit, hardiness.

Ilex integra: High-altitude collections from Cheju and Ullung; yellow-fruited, from Ullung Island.

## 6) Other endemic tree species for research:

Acer okamotoanum and A. takesimense: two endemic species from Ullung Island.

Alnus maximowiczii: Ullung Island is the only native site in Korea.

Fagus multinervis: Ullung Island endemic; only Fagus in Korea.

Phellodendron insulare: Ullung Island endemic.

Tilia insularis: Ullung Island endemic.

There are many other species from these islands which will be of interest for collections and research programs in other institutions. Some of these are as follows:

#### Broadleaf Evergreen Trees and Shrubs

Both islands are rich in broadleaf evergreen species, some growing at altitudes that indicate the potential for enhanced cold-hardiness:

Actinodaphne lancifolia

Litsea japonica

Aucuba japonica

Machilus (Persea) japonica

Camellia japonica

Machilus (Persea) thunbergii

Castanopsis cuspidata

Myrica rubra

Cinnamomum camphora

Neolitsea ociculata

Cinnamomum japonica

Neolitsea sericea.

Cleyera japonica

Osmanthus heterophyllus

Daphne kiusiana

Pittosporum tobira

Dendropanax trifidus

Quercus acuta

Distylium racemosum

Quercus gilva

Fatsia japonica

Quercus glanca

Ilex rotunda

Quercus myrsinifolia

Illicium religiosum

Quercus salicina

Ligustrum japonicum

Rhaphiolepis umbellata

Ligustrum lucidum

Symplocos prunifolia

Ternstroemia japonica

### Other Species Deserving Special Attention

Abelia insularis: Ullung endemic.

Abies koreana: Cheju; very restricted range.

Acanthopanax koreanum: Cheju endemic.

Adina rubella: Cheju is only native site outside China.

Adonis amurensis: collect in wild on Cheju.

Amelanchier asiatica: Cheju is only native site in Korea.

Aruncus aethusifolius: exceptional herbaceous perennial ground cover -- look for very dwarf forms on Cheju.

Asarum maculatum: Cheju endemic; very ornamental; endangered.

Campanula takesimana: very beautiful Ullung endemic.

Clethra barbinervis: Cheju is only native site in Korea.

Corylus hallaisanensis: Cheju endemic.

Cotoneaster wilsonii: Ullung endemic; only Cotoneaster species in extreme east Asia.

Hepatica maxima: very ornamental Ullung endemic.

Hosta spp.: endangered; especially seek dwarf sub-alpine forms.

Ligustrum foliosum: Ullung endemic.

Lilium harisonii: rare and beautiful Ullung endemic.

Lonicera insularis: Ullung endemic.

Maackia fauriei: Cheju endemic.

Ostrya japonica: Cheju is only wild site in Korea.

Physocarpus insularis: Ullung endemic.

Pinus parviflora: Ullung is only native site in Korea.

Rhamnus taquetii: Cheju endemic.

Rhododendron aureum: very hardy evergreen species rare in Korea; collect on Ullung.

Rhododendron brachycarpum: very hardy evergreen species rare in Korea; collect on Ullung.

Rhododendron dauricum: interesting dwarf alpine forms on Cheju; extremely hardy.

Rhododendron mucronulatum: dwarf alpine forms on Cheju.

Rhododendron yedoense var. poukhanense: valuable double and white forms reported wild in Cheju; excellent hybrid parent.

Salix hallaisanensis: very ornamental Cheju endemic.

Sambucus pendula: very ornamental Ullung endemic.

Sapindus mukorossi: rare tree; collect on Cheju.

Sedum takesimense: Ullung endemic.

Sorbus commixta: excellent heat-resistant species which occurs in exceptionally good forms on Ullung.

Symplocos coreana: Cheju endemic.

Tiarella polyphylla: Ullung endemic.

Tsuga sieboldii: Ullung is only native site in Korea.

Wasabia koreana: Ullung endemic; culinary.

Zanthoxylum ailanthoides: rare tree; collect on Ullung.

Zanthoxylum coreanum: Cheju endemic.

### Collecting Strategy

Collecting in 1986 will be organized as two trips; one in late June through late July (30 days) to collect seed of Prunus species and to scout collecting sites for autumn, and a second trip in late September through October (38 days) to collect seed of other species.

The summer trip requires the USNA representative and a Korean field assistant. Other Americans can be added at an additional cost of about \$3500 per person. If Prunus germplasm is not required, the summer trip can be cancelled. Additional participants in summer would increase the number of herbarium specimens collected. Time in the field in summer would be equally divided between Cheju and Ullung Islands.

The autumn trip requires two representatives from the USNA and two participants from sponsoring institutions. The ideal USNA team is a horticulturist familiar with the Korean flora, and a taxonomist who works with Asian woody plants. Six weeks should be spent in the field, with two weeks on Ullung Island and four weeks on Cheju Island. Time in the field should be increased if the summer trip does not take place. In any case, the team leader will arrive in Korea at least four days in advance of the team to complete arrangements.

Collecting in protected areas on Cheju and Ullung will require special permission from the Korean government. Special arrangements with the Korean Ministry of Defense will not be required. Potential participants should keep in mind that field work will require very strenuous hiking and some climbing. Field conditions on Ullung Island (where there is no motor transport) might be very uncomfortable.

**Budget - Summer Trip 1986**

(1 USNA Staff)

Airfare \$1,400

Per diem - 30 days

Seoul - 6 days @ \$100 600

Ullung - 12 days @ \$53 636

Cheju - 12 days @ \$68 816

Field assistance 1,500

Internal Transport 1,000

Supplies 500

Miscellaneous 400

TOTAL \$6,852

Additional participants can be added for about \$3500 each.

**Budget - Autumn Trip**

(2 USNA Staff, 2 Participants From Cooperating Institutions)

Airfare \$1,400 x 4 \$ 5,600

Per diem - 38 days (team leader 42 days)

Seoul - 9 days - \$100 x 9 x 3 2,700

team leader - \$100 x 13 x 1 1,300

Cheju Island - 17 days - \$68 x 17 x 4 4,624

Ullung Island - 12 days - \$53 x 12 x 4 2,544

Field Assistance 2,200

Internal Transport 2,800

Supplies 800

Miscellaneous 700

Excess baggage (plants) 500

TOTAL \$23,768

The cost of a full share will entitle cooperating institutions to the following:

- 1) The opportunity to nominate a participant for the autumn trip. Airfare and normal per diem expenses, plus other team expenses, will be paid for that participant from the trip budget.
- 2) A full share of germplasm collected. All germplasm will be sent to the USNA to be distributed among cooperating institutions.
- 3) A set of herbarium voucher specimens for the germplasm distributed.

It is understood that the U.S. National Arboretum will be permitted to judge the fitness of potential participants for the itinerary proposed. The designated USNA team leader will make final decisions in the field about itinerary and all matters relating to collecting and processing germplasm and specimens.

The cost of a full share for the 1986 exploration of Cheju and Ullung Islands is set at \$12,000. Partial shares can be arranged on a case by case basis if an institution does not require all the benefits of a full share.

All matters relating to the financing and conduct of the exploration are handled through the offices of the Friends of the National Arboretum, Inc., 3501 New York Avenue, NE, Washington, D.C., 20002.

Questions about the proposal and our proposed itinerary can be directed to Barry R. Yinger, Curator of Asian Collections, U.S. National Arboretum, 3501 New York Avenue, NE, Washington, D.C., 20002.

March 27, 1985

SUBJECT: Documentation of cultivated woody landscape germplasm  
from Southeastern United States -- A proposal.

TO: H. M. Cathey

Purpose:

Through documentation, to inform plant breeders, the nursery industry, colleges, students and other serious workers, on the range of native and exotic woody germplasm (trees, shrubs, and woody climbers) cultivated in the southeastern United States. This effort will be the first written and herbarium voucher reference documentation for the valuable germplasm bank found in nurseries, parks, botanical gardens and arboretums, college campuses, cemetaries, roadsides and median strips, experiment stations, and private gardens in all or portions of 13 contiguous states of Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida panhandle, Alabama, Mississippi, Louisiana, Eastern Texas, Arkansas, and Tennessee.

Method:

To document, through a series of field trips, the full range of woody plants (trees, shrubs, and climbers), as a data base of germplasm materials found growing over the entire area of the survey. Field trips are conducted in spring, summer, and autumn, since flowering and fruiting materials are necessary for critical identification. At each site, voucher herbarium specimens are prepared in duplicate. These collections are then brought to the National Arboretum for study and identification as the data base of documented materials to be included in a proposed Manual on the identification and description of woody plant germplasm cultivated in the Southeastern United States.

Contents:

The Manual will be a descriptive work on the identification of germplasm materials obtained from documented on-site collections. It is designed to include:

- a. Brief descriptions of each family, i.e. range of habit and related salient details of the flowers, size of family and distribution.
- b. Analytical keys to the genera found within the scope of the Manual.
- c. Generic descriptions, i.e. the salient characters applicable to the scope of the Manual.
- d. Analytical keys to the species found within the scope of

the Manual.

- e. Descriptions of the species, including chromosome number, native range, introduction date in the U.S. (when known), flowering dates, hardiness zone, critical notes, i.e. unique aspects, including size of largest documented specimen, frequency of occurrence, horticultural worthiness, citation of documented specimens.
- f. Cultivars. Information will include the pertinent literature references plus a list of all names in genera with only a few cultivars. In genera, (such as Camellia) with a large number of cultivars, a classification by flower type, growth form, etc. with examples will be included.

#### History of the Project:

This project was initiated in 1968. At that time, the decision was made to prepare a Manual that would be based on documented germplasm, i.e. voucher herbarium specimens for accuracy and as a scientific data base. The literature on cultivated plants is replete with data based primarily on literature sources rather than on documented material. This error we wanted to avoid in this Manual.

Since 1968 all 13 states have been visited and over 7,000 collections have been prepared. Although the inventory is nearing completion, some further critical collections are essential.

#### Objectives (3 yrs.):

1. Continue field collecting to various sites as needed to complete the germplasm inventory and data base.
2. Preparation of the Manual, family by family. In the meantime, this could generate short papers on critical groups i.e. Aesculus x hybrida, not A. x dupontii; the correct name for the southern buckeye as Aesculus flava and not A. octandra; the identification of Magnolia ashei vs. M. macrophylla.

#### Participants:

F. G. Meyer (leader)  
T. R. Dudley  
P. M. Mazzeo and  
Other invited specialists.

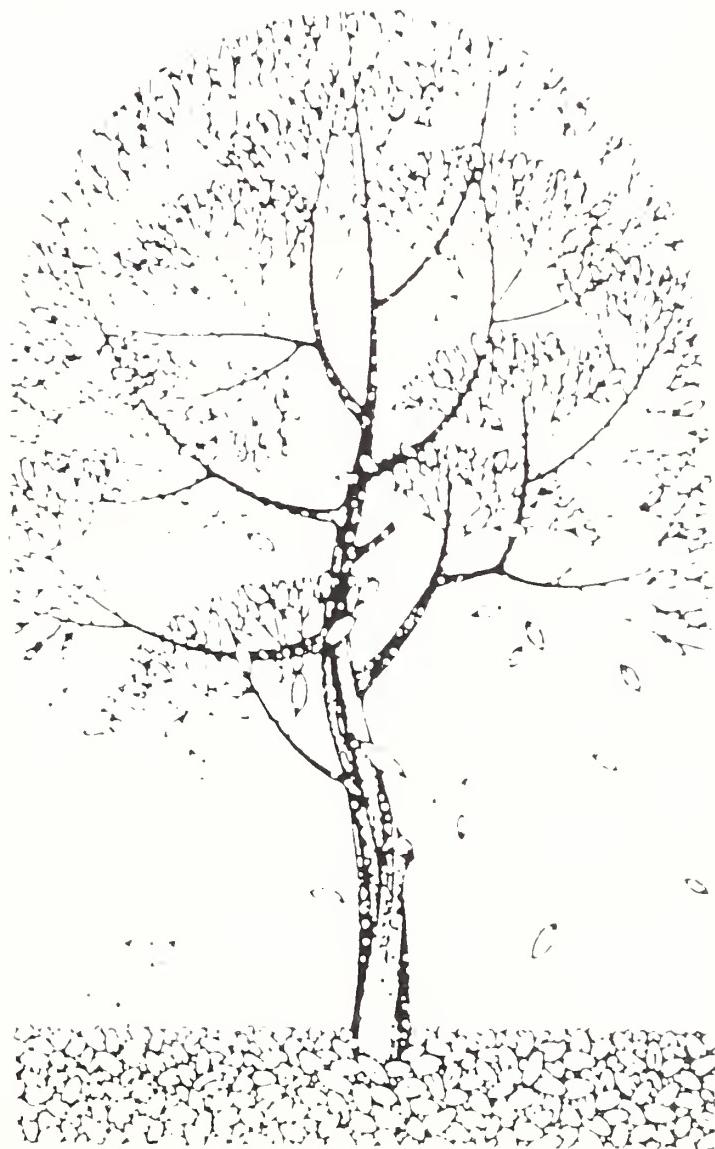
#### Budget (3 yrs):

- |   |             |
|---|-------------|
| a. Field trips consisting of one to two weeks in length, or shorter, at least<br>(two or more trips per year) | \$10,500.00 |
|---|-------------|

- b. New field van 12,000.00
- c. New personnel:  
Herbarium assistant (GS-5) \$14,390.00  
Field collector (GS-5) 14,390.00
- d. Word processor (for office use) for manuscript preparation 4,000.00

*Frederick G. Meyer*

FREDERICK G. MEYER  
Supervisory Botanist



## THE NEXT, NEW U.S. NATIONAL ARBORETUM, 1984 MASTER PLAN

### AN OVERVIEW/OUTLINE

When you arrive in your Nation's Capitol--you are immediately impressed with the CITY OF TREES, ALL OF THE MANY PARKS and their seasonal displays, the many elegant FEDERAL BUILDINGS, and the MUSEUMS. All subjects, artifacts, arts, sciences, traditions, and ages are presented in a vast array of exhibit halls. Most visitors, regardless of their origin, say that it is the most comprehensive gathering of educational museums in the WORLD.

The U.S. NATIONAL ARBORETUM, the PLANT LIFE CENTER FOR NORTH AMERICA is located a 10 minute ride from all of the other museums. Proceed east on Maryland Avenue from the U.S. Capitol, turn left on Bladensburg Road to the 444 acre U.S. National Arboretum (USNA) on the right side of the road. The 61 gardens, collections, and research plots are placed on the landscape of an eastern climax deciduous forest. Almost 10 miles of roads cross in and around natural hills, valleys, streams, ponds, and paths. On display are diverse plants, such as a pine tree given by the Emperor of Japan as a gift for our Bicentennial and a grove of Dawn Redwoods until recently thought to be extinct. Everywhere the visitor is surprised to find such a diversity of plants growing in natural settings so close to the center of a large metropolitan area.

During the summer of 1984--the next new MASTER PLAN for the U.S. National Arboretum was created by Kidde Consultants, Inc., in cooperation with the staff of the USNA. The purposes envisioned for the arboretum:

- CREATE - The museum about plants for North America
  - 1) INDOORS - ALL WEATHER EXPERIENCES
  - 2) OUTDOORS - A TRAM RIDE TO THE 444 ACRE GARDEN
- EXPLORE - The research facility to search, breed, select and introduce woody plants for the landscapes of North America.
  - 1) Collections: GENETIC DIVERSITY OF LANDSCAPE PLANTS
  - 2) Genetics: HI-TECH TO INTRODUCE SCIENCES HIGH PERFORMANCE PLANTS
- DISCOVER - Display the recent achievements of American Agriculture
  - 1) Technology: IMPACT OF RESEARCH ON THE LIFE OF NORTH AMERICANS
  - 2) Educational events: THE PLACE WHERE THE KNOWLEDGE CAN BE EXPERIENCED

- FESTIVAL SETTINGS - The place in Washington to see beautiful landscape plants
  - 1) Seasonal Displays: DAZZLING PLANTS, COLORS, AND DESIGNS TO INSPIRE ALL VISITORS
  - 2) Showcase: COOPERATING ORGANIZATIONS PRESENT NATIONAL SHOWS
- THE MASTER PLAN IN OUTLINE
  - 1. Objective: A World class facility
  - 2. Goals
    - Further research and education concerning tree and plant life
    - Accommodate visitors in an efficient, attractive, and informative manner
    - Disseminate information and make the visitor feel both welcome and comfortable
    - Provide for the efficient and effective maintenance operation and management
    - Develop accurate maps of all utilities, gardens, collections and research plots
  - 3. Implementation Measures
    - A General Site Improvements:
      - Establish a separate Public Affairs Office
      - Provide new visitor facilities
      - Establish new signs
      - Establish a staffed visitors kiosk at entrances
      - Provide alternative means of transportation for the visitor
      - Provide a food service
    - B Education, Gardens, and Collections:
      - Refurbish and upgrade existing gardens and collections that are to be retained
      - Relocate and redesign gardens that are not in good shape
      - Establish new gardens/collections
      - New tree collections
      - Latrobe Column Garden
      - Discovery Gardens
      - Festival Gardens
      - Establish plant outreach programs
    - C Introduction, Exploration and Research:
      - Develop plans and grid system for plants at USNA, BARC and GPIS
      - Eliminate all non-essential plants from USNA and BARC to make room for new collections
      - All collected plant material should have a place to be set out upon its return and areas of collection carefully selected

D. Repositories:

- Create the most complete library, plant records and herbarium on woody ornamental plant material at the USNA that exists anywhere
- Catalog and map all plant material associated with the USNA including those at Glenndale Plant Introduction Station (GPIS) and the Beltsville Agriculture Research Center (BARC)
- Provide additional climatically controlled space to expand the capacity of the USNA herbarium

● MASTER PLAN DEVELOPMENT

A. General Site:

- Influence surrounding neighborhood by beginning its own beautification program
- Develop a signage system to move visitors through grounds
- Provide adequate restroom facilities, bike racks, and trash receptacles

B. Plant Life Center:

- Provide all-weather experience for all visitors, including exhibition, meeting, reception, restrooms, restaurant, and picnic areas
- Present a strong visual and physical connection to the parking areas and to the other parts of the USNA
- Develop a secured area to allow night use without impacting the rest of the site

C. Administration and Service Area:

- Develop additional space in the Administration Building, Greenhouses and Service Areas
- Relocate services area to the northwest corner of the site to provide areas for shops, tram storage and repairs, plant recycling and storage. Area to be serviced by a new entrance at "T" Street.
- Access to Administration Building from "R" Street should be restricted to employee and volunteer parking.
- Screen area to buffer activities of the research and education programs.

D. Gardens and Collections:

- Upgrade, expand, develop, relocate and refurbish gardens/collections

- Expansion:
- National Herb Garden
  - National Bonsai Collection
  - Asian Valley
  - Court of Honor

- Refurbish:           ● Azalea hillside  
                        ● Rhododendron and Azalea Valley  
                        ● Maple, Holly, Magnolia, Fern Valley, Cherry  
                        and Crabapple
- Proposed:           ● Labrobe Column Garden  
                        ● North American Garden  
                        ● Discovery Gardens--(plant Achievements  
                                of the U.S. Department of Agriculture)  
                        ● Festival Gardens--(Display of plants in  
                                the restored brick (kilns)
- Special Areas:     ● Mt. Hamilton second highest vantage point  
                                (239 feet) to Monumental Washington  
                        ● Indian Ceremonial Grounds (corner of Hickey  
                                Run and the Anacostia)  
                        ● Spring Houses (two circular houses)

E. Ferry: Link between USNA and the Kenilworth Aquatic Gardens

#### 5. Long-Term Objectives:

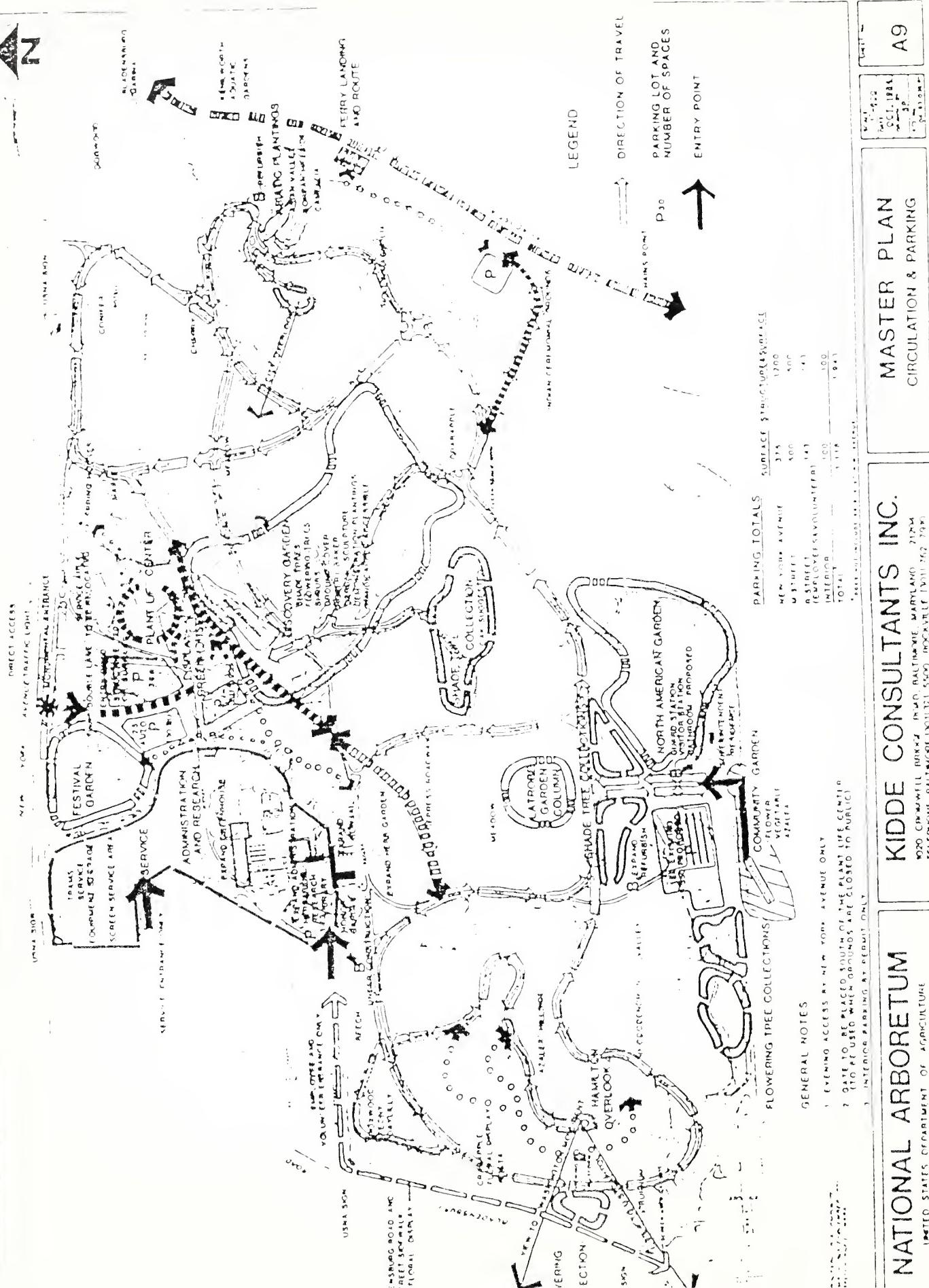
- A. Transportation:     ● Public transportation  
                        ● One-way  
                        ● Signage
- B. Major Visitor Entrances:  
                        ● New York Avenue  
                        ● M Street - Maryland Avenue
- C. Parking Capacity:

<u>Location</u>	<u>Surface Parking Only</u>	<u>Surface Parking Plus Structure</u>
NY Avenue Entrance	375	1,200
M Street Entrance	500	500
R Street Entrance	<u>143</u>	<u>143</u>
TOTAL	1,118	1,943

- D. Tram System: Recommends a route with designated stops be instituted
- SELECTED MASTER PLAN DRAWINGS



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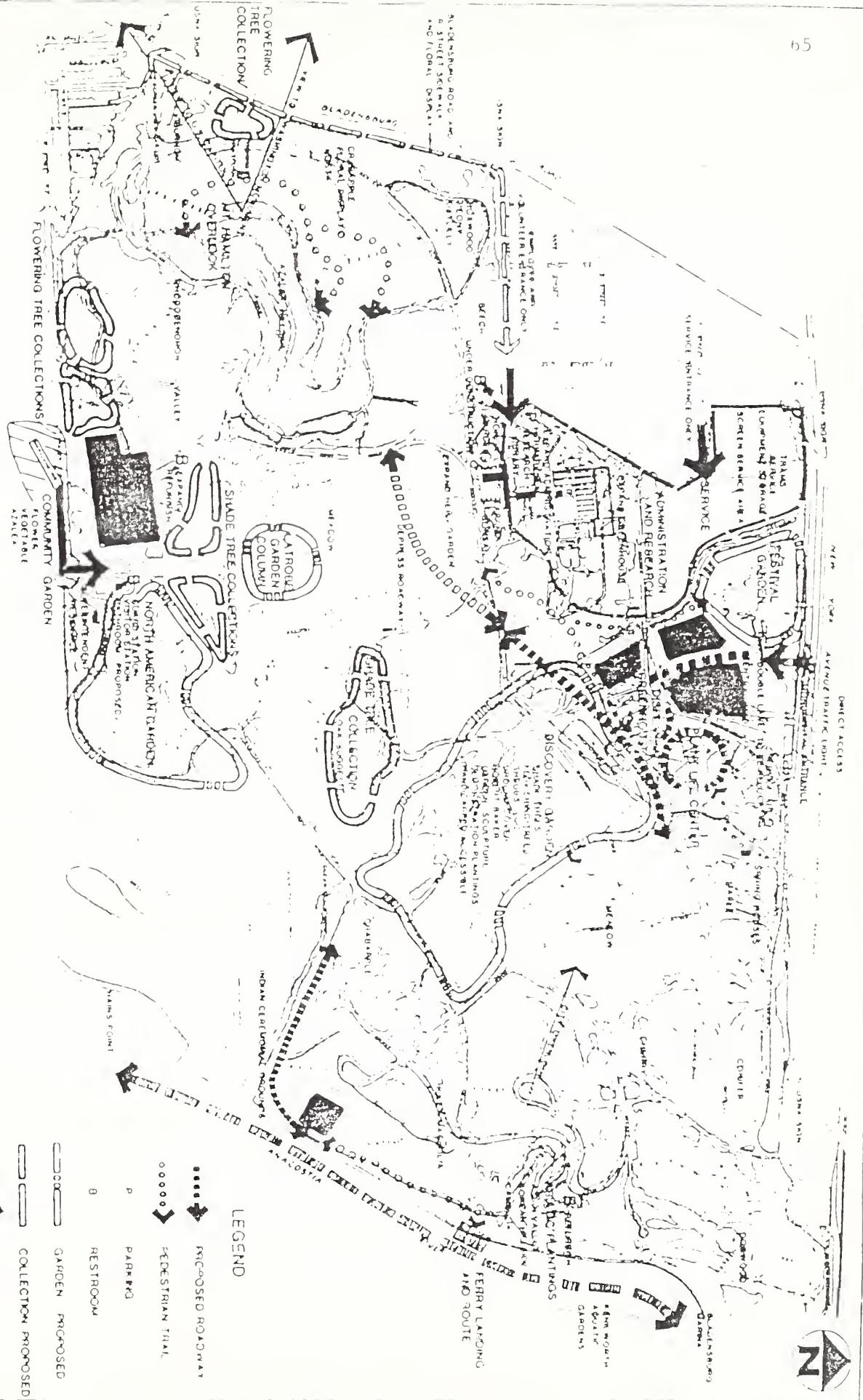


NATIONAL ARBORETUM

UNITED STATES DEPARTMENT OF AGRICULTURE

**KIDDE CONSULTANTS INC.**

MASTER PLAN



## U.S. NATIONAL ARBORETUM--Director's Summary Comments

The U.S. National Arboretum is a world class facility of the Agricultural Research Service, U.S. Department of Agriculture, located a 10-minute ride to the west of the U.S. Capitol. Since its creation by an Act of Congress in 1927--the Arboretum has grown to 444 acres, making up one percent of the greenspace of the District of Columbia. It has become the center/outdoor museum for PLANT LIFE for North America.

The Arboretum occupies a unique responsibility for all who visit in 61 different gardens and collections. The landscaped areas of introduced plants have been skillfully placed in one of the most varied and beautiful natural areas in North America. Its land contains 249 foot Mt. Hamilton, the second highest peak in the District. It is covered with acres of climax deciduous forests filled with native and some endangered plant species. It also has several large open meadows, streams, ponds, valleys, buffs, and marshlands. It is crossed with almost 10 miles of paved roads and miles of paths from one garden or collection to another.

Fitted into these spaces are world-famous gardens and collections. One mountain is covered with 70,000 azaleas and 1500 dogwoods and receives up to 50,000 visitors in a day when they are flower in late April, and early May. The Arboretum also houses the National Bonsai Collection in a specially designed Japanese Garden and display pavilion. The 50 plus trees and shrubs with ages up to 350 years have been trained to be miniature versions of the large landscape plants. One of the trees is an 180 year old pine, the personal gift of the Emperor of Japan for our Bicentennial. The National Herb Garden in its 10 speciality Gardens demonstrates the uses and traditions of almost 1800 different kinds of herbs growing as herbaceous plants, shrubs, and trees. The 3-acre garden is the largest and most comprehensive collection of herbs in the world. It was a gift of the Herb Society of America to the American people.

The Arboretum, thanks to contributions of the Friends of the National Arboretum, has added 2 new gardens to its collections in 1983-1984. Its Asian Valley is an 1800 foot valley running to the Anacostia River and is filled with the sounds of running water from a 600 foot water fall and course. The right side of the valley is landscaped with plants from China while the left side is filled with ones from Japan. Plans have been made to add plants from Korea on the buffs above the valley. The plants will come from the 1984 collecting trip to the west side and islands of Korea.

In June 1984 the 3-acre National Country Garden was opened to serve as a demonstration of gardening in urban areas. More than 100 organizations, firms, clubs, foundations, and individuals made contributions to help build 15 small gardens of vegetables, flowers, fruit trees, and herbs. Plants were grown in raised beds and vertical gardens and were used to train almost 900 Peace Corp volunteers to take the information to third world countries.

The U.S. National Arboretum conducts research on the exploration, collection, identification, breeding, and introduction of "elite" plants for America's landscapes. It has sent explorers to many parts of the world but has stressed collecting in Asia, particularly the Peoples Republic of China (1980), Japan (1982, 1983) Korea (1984). These newly collected plants, joining collected and introduced North American plants, are being preserved in a woody plant repository which is being established on a 500 acre block of land at the Beltsville Agricultural Research Center. Coupled with a herbarium with more than 500,000 specimens of cultivated plants from the entire world, the arboretum has the most comprehensive resources of woody plants to introduce new and exceptional plants for the stress-riddled landscapes of America. Thus far, the Arboretum, in cooperation with more than 1000 locations around the world, has introduced 100 new plant derived from its collection and breeding research. It introduced in 1970 'Mohave' pyracantha: with Chinese-red fruit and disease resistance, it has become the most widely grown new shrub in the world. The Arboretum has also introduced new disease resistant and stress tolerant magnolias, hollies, viburnums, hibiscus, and crape myrtle. In 1984 two new London plane trees, called 'Columbia' and 'Liberty' were introduced. The new hybrids were a recreation of the ancient cross between a North American *P. occidentalis*, and European (Turkey), *P. orientalis*, *Platanus* species. They possess, as the original seedlings did but lost in subsequent generations, resistance to leaf diseases, city smoke and alkali. They are also highly adapted to wound compartmentalization and will undoubtedly become the most widely used landscape tree for urban gardeners in the world.

The achievements of the Arboretum are currently being experienced by more than one million visitors annually -- double the number only three years ago. In cooperation with the National Capital Area Federation of Garden Clubs, Inc. 100 volunteers guide groups, of all ages and traditions to the gardens, collections, and research program. More than 30 flower and garden shows are held annually on the grounds for speciality plant societies. Living Legends are held monthly (first Sunday and Wednesday afternoons) to introduce the visitors to the scientists, curators, and gardeners of the Arboretum. Special horticultural and botanical classes are held in cooperation with the USDA Graduate schools. Classes are also held for Master Gardeners and Youth Gardens to upgrade their knowledge and skills.

What is needed: The U.S. Arboretum needs a workable base of funds to maintain its valuable collections, gardens, and woody plant germplasm. It is the only facility in the U.S. that has this responsibility, the mechanism to accomplish it, and the reservoir of woody plants to draw on.

It needs to: • Upgrade its laboratories, greenhouses and related facilities to be able to perform its primary objectives of preserving and introducing 'elite' woody plants for the landscapes of America

- Expand its educational outreach to every garden club, plant related organization, and environmental group through not only the creation of a FOOD AND FITNESS FESTIVAL on the grounds of the Arboretum but also through the media.
- Maintain high standards of public safety and security for the millions of visitors to the 444 acre outdoor museum. Also provide facilities for the handicapped for easy access to the gardens, collections, and buildings.
- Create the woody plant repository for North America by assembling a staff and facilities to begin to plant out, document, and distribute new and "elite" germplasm for landscaping.
- Develop an international program of collecting and exchanging exceptional plant material for use in breeding of new landscape plants. Fund on a continuing basis explorations to domestic and foreign locations.





# FONA NEWS

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Friends of the U.S. National Arboretum

1010 WISCONSIN AVENUE, N.W. • SUITE 530 • WASHINGTON, D.C. 20007

MAY, 1985



A near capacity crowd turned out March 9 for "Orchid Day."

## "Orchid Day," Flower Show Reception Draw Hundreds

Held almost back-to-back in early March, as though to celebrate the re-emergence of spring, two FONA-sponsored events attracted hundreds of attendees.

Many of the 95 people who came to the Arboretum's [First Annual] "Orchid Day," Saturday, March 9, took the first step in what may become a life-long love affair with these fascinating plants—even the variety called *Dracula vampira 'Bula Lugosi'*.

The near-capacity attendance turned out despite one of the first beautiful weekend spring days to learn more about this exotic flower. Among the facts they learned:

- With 25,000 members, orchids are the largest plant family, including the showy "corsage" orchids and also some blossoms that are downright ugly.
- Some plants grow as tall as 7 feet, some blossoms as large as 6 inches, some as small as 1/2-inch, with some stalks sporting as many as 50 blooms.
- Insects, hummingbirds, or on your windowsill a toothpick all fertilize orchids.

• Orchids grow in tropical jungles in deserts, under water, below-ground, on every continent including Antarctica.

• Vanilla is an orchid type.

Those attending however, came not to learn mere facts but rather the care, cultivation, and preservation of the three major orchid types, cattleya, paphiopedilum, and phalenopsis.

Speakers Tom Dundon, Dr. Robert J. Griesbach, Robinson P. Abbott, Howard W. King, Joan Kasprzak, and Merritt W. Huntington, who are all long-time growers, described the best soil mixtures, watering procedures, lighting conditions, and care for diseased or insect-ridden plants.

Co-sponsored by the National Capital Orchid Society and FONA, the event was held, according to Dundon, Orchid Society president, as the Society's way of expressing its appreciation for use of Arboretum facilities. The day's proceeds went to FONA's Education Fund.

So successful was the event, plans are already under way to repeat it next year.

(Events continued on page 8)

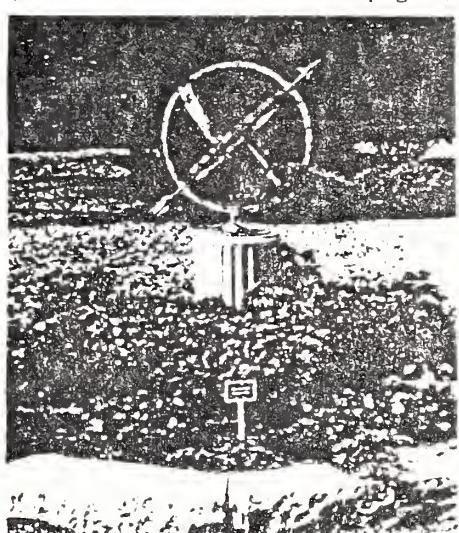
## Herb Garden Offers Your Senses a Feast

The National Herb Garden at the Arboretum is a place to captivate all your senses—sight, sound, smell, hearing and taste, and perhaps most of all, a place to promote your sense of well-being.

With its three related sections—the Garden offers something of interest at every season, but May is the month to see it at its best.

The Garden's three sections include the Knot Garden, a 25 foot by 50 foot "contemporary" treatment of a Tudor favorite, a garden of "old" roses and 10 specialty gardens highlighting herbs various uses.

A bicentennial gift from The Herb Society of America to the American people, the Garden was dedicated June 12, 1980. The Society "raised all the money to build the garden," by themselves without professional fundraisers, says Holly H. Shimizu, the Garden's Curator. Its volunteers, together with the Arboretum staff, organized the installation, built, con-



An armillary sphere, an ancient sundial long associated with herb gardens graces the rose plantings.



# FONA NEWS

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## Friends of the U.S. National Arboretum

1010 WISCONSIN AVENUE N.W. SUITE 630 • WASHINGTON D.C. 20007

MAY, 1985

### President's Message

Being President of the Friends of the National Arboretum has brought me many wonderful opportunities. One is the chance to work with the outstanding people who comprise our Board of Directors and the Arboretum staff.

I particularly want to thank the Board members. They support the Arboretum in so many ways attending meetings giving of their time, energy and yes their funds to help insure the Arboretum's continued research, development and other activities. I'll introduce these wonderful people to you.

Those of us who live here in the Washington area are fortunate to be able to work with the Arboretum staff from maintenance workers and office staff through the volunteers, scientists and administrators. They are so generous with their time and knowledge. An example of their corporate dedication to the staff members who come in on weekends—without pay—is assure Arboretum programs such as "Living Legends" and FONA events such as "Orchid Day" run smoothly and successfully. It is a privilege to work with them.

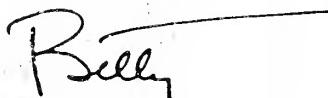
Let me extend an invitation to you to join in these programs and help to continue these many outstanding activities.

No matter what your talent, the Arboretum has a function in which you can participate. Many of them are perfect for retired persons who want to keep active or for those who are at home and who want something vital and meaningful in their lives. You can work on a schedule perhaps coming in to do plant pollinations or work in the herbarium or when you can eke out a few hours in an otherwise busy schedule helping with typing, planting幼苗, or picking produce from the National Country Garden to distribute to local food banks. The personal gratification you receive will be two-fold: help

to assure the Arboretum's continued development and the chance to make new friends and work with the staff.

Those of us who live here in the area have the privilege of working with an institution whose efforts bring national benefits from saving the germplasm of endangered plants in California through establishing cherry trees in Minnesota. Will you volunteer today? I'll look forward to meeting and working with you.

Sincerely



Elizabeth C. Rea

### Herb Garden Offers Your Senses a Feast

The National Herb Garden at the Arboretum is a place to captivate all your senses: sight, sound, smell, hearing, and taste, and perhaps most of all, a place to promote your sense of well-being.

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(*"Herb Garden," continued on page 6*)



An armillary sphere, an ancient sundial long associated with herb gardens, graces the rose plantings.

# Program Exchanges Sugar Maple, Crabapple Seeds

U.S.-Soviet relations with the Soviet Union can hardly be characterized as warm these days. Roland M. Jefferson, director of the Arboretum, however, still hopes the Arboretum's international exchange program can help to strengthen friendly民間交流 relations.

In return for hardy flowering crabapple tree seeds from Russia, the Arboretum will send 350,000 American sugar maple tree (*Acer saccharum*) seeds there in exchange. IONA funds the people-to-people project.

The aim of the exchange is to achieve improved crabapple selections and more cold tolerant rootstocks, according to the letter Director Dr. Marc Cathey sent to organizations interested in seed collection. In addition, should the trees prove hardy they could extend the range of crabapple trees into the northern United States and Canada, Jefferson says.

There are 100 species of maples throughout the world, including 13 native to the United States, but no sugar maples currently grow in Russia, Jefferson points out. The tree, should it adapt well to its new surroundings, will in turn offer the Soviets several advantages: it is an excellent lumber source, its sap, as New Englanders know well, will provide a sugar source, due to its extreme hardness the wood makes excellent furniture and flooring (it was used for spokes in the pioneers' wagon wheels), and finally, it is hoped it will display the same flaming shades in autumn as it does in New England, although the Soviet climate may be too cold to encourage brilliant fall foliage.

The seeds have passed a quarantine inspection to insure they are free of disease (had diseased seeds been found, they would have required fumigation). Volunteers at the Southern States Seed Company spent three hours separating wings from seeds and professionally bagging them for shipment. They will be sent via the Army Post Office to the American agricultural attaché in Moscow who will deliver them to the USSR State Committee for Science and Technology.

Jefferson has had no direct contact with the Soviets; most of the correspondence and arrangements have

been handled by the International Foundation for the USSR, Lindenwood, Longmeadow, Massachusetts.

While the seeds return will keep some seeds for research, their main purpose is ornamental, and if disease resistant and fruiting, they will be sent to those contributing sugar maple seed.

## Children's Imaginations Captured

One of the most important aspects of the program, Jefferson says, is that it gives children in participating countries a chance to see each other in a different light even if they can't contact each other directly. The Trade Council is investigating whether correspondence can be established between Soviet and American schoolchildren who participated in the program.

The exchange effort was publicized in the *Jellybean Journal*, the children's section of the Louisville Courier-Journal, the Kansas City Star, the New York Times and several other publications, with excellent results.

Letters the Arboretum has received testify to the collectors' interest in the program. "Before we started collecting seeds and identifying maples, I asked these five children what they thought of Russians." Chris Nelson, a teacher at First Day School, Phoenixville, Pennsylvania, writes. Three said they were bad and the other two didn't know. We talked about prejudice and how once you get to know someone you usually are better able to see his/her good points." The letter the children enclosed with their contribution reads, "We picked some sugar maple seeds to give to you. We hope this will help you. Good luck."

One contribution was collected from the "Norwich Maple" in Connecticut, believed to be more than 200 years old and perhaps the oldest sugar maple in the United States.

The Campus Arboretum Association of Haverford College, Haverford, Pennsylvania collected seeds from the three largest trees on campus and enclosed with the contribution a letter written in Russian for the crabapple donors. The letter whose text appears at right will be forwarded along with the seeds, Jefferson says.



Roland Jefferson displays donated sugar maple seed

Граждане Дружбы! мы хотим присыпать вам семена сахара и яблони. Мы надеемся, что они будут расти и приносить вам радость. Мы хотим, чтобы вы были здоровы и счастливы. Ваше здоровье и счастье - это самое главное для нас. Спасибо за вашу помощь. Мы будем рады видеть вас снова. Удачи вам!

Лесопарк  
Харвард

Dear friends,

We are sending you these seeds as a sign of our friendship. We hope that they will grow well in your soil. Let these be symbols of our good relations and mutual hopes for peace between our countries.

Sylviculture Nursery  
Haverford College

**Gardening in a small space**

The National Arboretum will show you how

Thursday, Aug. 23, 1984 The Sentinel, Cortland, N.Y. — A11

**D.C.'s National Arboretum:  
an 'undiscovered' treasure'**

THE MONTGOMERY JOURNAL THURSDAY, AUGUST 23, 1984 A11

**National Arboretum  
is among capital's  
'hidden' treasures****Capitol's Columns  
Moved to Arboretum**

A24

THE NEW YORK TIMES, FRIDAY, DECEMBER

**WASHINGTON TALK***Budding Détente***Briefing**United States/Soviet  
Sugar Maple/Crabapple  
Seed Exchange

Crape myrtles offer late summer flowers, winter landscape

# DIVERSION

FOR PHYSICIANS AT LEISURE SEPTEMBER 1984

## LIVINGWALLS

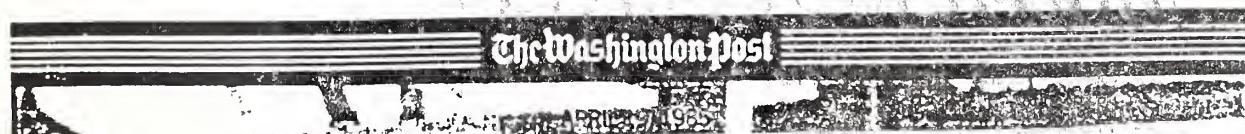
BALTIMORE SUN

They take gardening out of the dirt  
and literally raise it to a higher art



Fence Painter

Jim Newcome, 41, of St. John's Church, paints the National Arboretum fence along Rock Creek Park NE. This project to paint the fence, which was erected last year, is expected to be completed this month.



The Washington Post

WEEKEND AT LARGE

## The Flower Powerhouse

From the peak of Mount Hamilton to the floor of Asian Valley, the Arboretum's a thing of beauties. (pp 5, 6, 7)

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